



FC-4-1.ST25.txt  
SEQUENCE LISTING

<110> Wisnewski, Nancy  
Becher, Anna M.  
Jarvis, Eric

<120> NOVEL FLEA ECDYSONE AND ULTRASPIRACLE NUCLEIC ACID MOLECULES, PROTEINS  
AND USES THEREOF

<130> FC-4-1

<140> 10/065,200

<141> 2002-09-25

<150> 09/435,019

<151> 1999-11-05

<150> 60/107,559

<151> 1998-11-06

<160> 71

<170> PatentIn version 3.1

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<212> DNA

<213> Ctenocephalides felis

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atcgcaagat tagtgtggta ccaagatgga tatgaacaac cttctgagga agacctacga 360  
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cggctcatgaa atgcgaccca ttacctcag aagcaactaa agtgaaattt ttgtcagaca	180
agattcttgc tgaaaacaga attcgaaatg ttccaccttt gactgcaaat caagaatatg	240
tgatcgcaag attagtgtgg taccaagatg gatatgaaca accttctgag gaagacctac	300
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caac atg aaa cga cgt tgg tct aac aac ggt ggc ttc caa acc ttg cgg 649  
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Ser Gly Val Gln Gly Cys Gly Ala Val Ala Ala Leu Pro Ser Ile Ala  
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Thr Gln Val Pro Leu Gly Leu Pro Ala Met Asp Leu Pro His Thr Pro  
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## FC-4-1.ST25.txt

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 Tyr Val Cys Lys Phe Gly His Thr Cys Glu Met Asp Met Tyr Met Arg  
 180 185 190

cgc aaa tgt cag gaa tgt agg ctc aag aaa tgt ttg gct gtc gga atg 1225  
 Arg Lys Cys Gln Glu Cys Arg Leu Lys Lys Cys Leu Ala Val Gly Met  
 195 200 205

cgc ccc gag tgc gtg gtt ccc gaa aac caa tgc gcc atg aag cga aag 1273  
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 225 230 235

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 Val Gly Lys Ser Ala Ala Pro Leu Ala Asn Ser Ala Leu Leu Gln Lys  
 240 245 250 255

cct gat att ttg cct gcg gtc atg aaa tgc gac cca tta cct cca gaa 1417  
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 260 265 270

gca act aaa gtg aaa ttt ttg tca gac aag att ctt gct gaa aac aga 1465  
 Ala Thr Lys Val Lys Phe Leu Ser Asp Lys Ile Leu Ala Glu Asn Arg  
 275 280 285

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 Arg Leu Val Trp Tyr Gln Asp Gly Tyr Glu Gln Pro Ser Glu Glu Asp  
 305 310 315

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 320 325 330 335

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 355 360 365

caa ata aca tta tta aag gca tgt tca agt gaa gta atg atg ctg cga 1753  
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aca ata gaa gat cta ttg cat ttt tgt cga cag atg tat act atg act	1897
Thr Ile Glu Asp Leu Leu His Phe Cys Arg Gln Met Tyr Thr Met Thr	
420 425 430	
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465 470 475	
gac cct aag tgt gga ata ttg ttt gcc aaa ctt ctt tct att ctt act	2089
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aaa ttg aag aac aga aaa ctt cct aga ttt tta gaa gaa att tgg gat	2185
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Val Thr Asp Asn Val Pro Pro Thr Ile Asp Ser Met His Ser Val Ser	
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Glu Asn Phe Tyr Asn Asn Glu Ser Asn Gly Thr Ser Asp Ser Thr Pro	
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ttaaaaagaa atcatgtgta ataaaatcat ttgtaggccg gccatactga tttacctata	2637
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Glu Leu Asp Leu Trp Val Tyr Glu Glu Ala Gly Leu His Pro Gly Ser  
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Gly Val Gln Gly Cys Gly Ala Val Ala Ala Leu Pro Ser Ile Ala Thr  
 65 70 75 80

Gln Val Pro Leu Gly Leu Pro Ala Met Asp Leu Pro His Thr Pro Arg  
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Ser Asp Ser Ala Gly Ser Ile Ser Ser Gly Arg Glu Asp Leu Ser Pro  
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Cys Gly Asp Arg Ala Ser Gly Tyr His Tyr Asn Ala Leu Thr Cys Glu  
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Gly Cys Lys Gly Phe Phe Arg Arg Ser Val Thr Lys Asn Ala Val Tyr  
 165 170 175

FC-4-1.ST25.txt

Val Cys Lys Phe Gly His Thr Cys Glu Met Asp Met Tyr Met Arg Arg  
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195 200 205

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225 230 235 240

Gly Lys Ser Ala Ala Pro Leu Ala Asn Ser Ala Leu Leu Gln Lys Pro  
245 250 255

Asp Ile Leu Pro Ala Val Met Lys Cys Asp Pro Leu Pro Pro Glu Ala  
260 265 270

Thr Lys Val Lys Phe Leu Ser Asp Lys Ile Leu Ala Glu Asn Arg Ile  
275 280 285

Arg Asn Val Pro Pro Leu Thr Ala Asn Gln Glu Tyr Val Ile Ala Arg  
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Leu Val Trp Tyr Gln Asp Gly Tyr Glu Gln Pro Ser Glu Glu Asp Leu  
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Arg Arg Ile Met Ile Ser Thr Pro Ala Glu Asp Glu Ala Leu Glu Phe  
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Phe Ala Lys Gly Leu Pro Ala Phe Thr Lys Ile Pro Gln Glu Asp Gln  
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Ile Thr Leu Leu Lys Ala Cys Ser Ser Glu Val Met Met Leu Arg Met  
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Ala Arg Arg Tyr Asp Ala Val Ser Asp Ser Ile Leu Phe Ala Asn Asn  
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Arg Ser Tyr Thr Arg Asp Ser Tyr Lys Met Ala Gly Met Ala Asp Thr  
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Tyr Ile Lys Thr Leu Lys Cys Tyr Ile Leu Asn Arg His Ser Gly Asp  
465 470 475 480

Pro Lys Cys Gly Ile Leu Phe Ala Lys Leu Leu Ser Ile Leu Thr Glu  
485 490 495

Leu Arg Thr Leu Gly Asn Gln Asn Ser Glu Met Cys Phe Ala Leu Lys  
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Leu Lys Asn Arg Lys Leu Pro Arg Phe Leu Glu Glu Ile Trp Asp Val  
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FC-4-1.ST25.txt

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Leu Glu Asp Val Ala Ser Gly Glu Val Thr Ser Ser Ser Gly Gly Ala  
20 25 30  
ctg gct gcg ttg agt ccg gct tcg tta ggt tcg ccc gag aca tat gcc 144  
Leu Ala Ala Leu Ser Pro Ala Ser Leu Gly Ser Pro Glu Thr Tyr Ala  
35 40 45  
gag ctg gat ttg tgg gtg tac gag gaa gct ggc tta cat cca ggt tca 192  
Glu Leu Asp Leu Trp Val Tyr Glu Glu Ala Gly Leu His Pro Gly Ser  
50 55 60  
ggt gtg caa gga tgc ggt gcg gtc gcc gcc ttg cca tcg atc gcg aca 240  
Gly Val Gln Gly Cys Gly Ala Val Ala Ala Leu Pro Ser Ile Ala Thr  
65 70 75 80  
cag gtc ccc cta gga ttg ccc gct atg gac cta ccg cac acg cct cgg 288  
Gln Val Pro Leu Gly Leu Pro Ala Met Asp Leu Pro His Thr Pro Arg  
85 90 95  
agt gac agt gcg ggt agc atc tca tca gga cga gaa gac ctg tca ccg 336

## FC-4-1.ST25.txt

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Pro	Ser	Ser	Leu	Asn	Gly	Tyr	Ser	Ala	Asp	Gly	Cys	Glu	Ala	Lys	Lys		
		115					120					125					
gcc	aag	aaa	ggg	ccg	gcg	ccg	cgg	cag	cag	gag	gaa	cta	tgt	ctt	gtg		432
Ala	Lys	Lys	Gly	Pro	Ala	Pro	Arg	Gln	Gln	Glu	Glu	Leu	Cys	Leu	Val		
		130					135				140						
tgc	ggc	gac	cgt	gcc	tcc	gga	tat	cat	tac	aac	gct	ctt	act	tgt	gaa		480
Cys	Gly	Asp	Arg	Ala	Ser	Gly	Tyr	His	Tyr	Asn	Ala	Leu	Thr	Cys	Glu		
145					150					155					160		
gga	tgc	aaa	ggt	ttt	ttc	cga	cga	agt	gtg	act	aag	aat	gcc	gtg	tac		528
Gly	Cys	Lys	Gly	Phe	Phe	Arg	Arg	Ser	Val	Thr	Lys	Asn	Ala	Val	Tyr		
				165					170					175			
gtg	tgc	aag	ttt	ggg	cac	acg	tgc	gaa	atg	gac	atg	tat	atg	cga	cgc		576
Val	Cys	Lys	Phe	Gly	His	Thr	Cys	Glu	Met	Asp	Met	Tyr	Met	Arg	Arg		
			180					185					190				
aaa	tgt	cag	gaa	tgt	agg	ctc	aag	aaa	tgt	ttg	gct	gtc	gga	atg	cgc		624
Lys	Cys	Gln	Glu	Cys	Arg	Leu	Lys	Lys	Cys	Leu	Ala	Val	Gly	Met	Arg		
		195					200					205					
ccc	gag	tgc	gtg	gtt	ccc	gaa	aac	caa	tgc	gcc	atg	aag	cga	aag	gaa		672
Pro	Glu	Cys	Val	Val	Pro	Glu	Asn	Gln	Cys	Ala	Met	Lys	Arg	Lys	Glu		
		210				215					220						
aag	aag	gca	cag	aag	gaa	aag	gac	atc	gga	cca	ata	tca	ggt	acc	gtt		720
Lys	Lys	Ala	Gln	Lys	Glu	Lys	Asp	Ile	Gly	Pro	Ile	Ser	Gly	Thr	Val		
225					230				235						240		
gga	aaa	tct	gct	gct	ccc	tta	gcg	aat	tct	gca	tta	ctt	cag	aag	cct		768
Gly	Lys	Ser	Ala	Ala	Pro	Leu	Ala	Asn	Ser	Ala	Leu	Leu	Gln	Lys	Pro		
				245				250						255			
gat	att	ttg	cct	gcg	gtc	atg	aaa	tgc	gac	cca	tta	cct	cca	gaa	gca		816
Asp	Ile	Leu	Pro	Ala	Val	Met	Lys	Cys	Asp	Pro	Leu	Pro	Pro	Glu	Ala		
			260				265						270				
act	aaa	gtg	aaa	ttt	ttg	tca	gac	aag	att	ctt	gct	gaa	aac	aga	att		864
Thr	Lys	Val	Lys	Phe	Leu	Ser	Asp	Lys	Ile	Leu	Ala	Glu	Asn	Arg	Ile		
		275					280					285					
cga	aat	gtt	cca	cct	ttg	act	gca	aat	caa	gaa	tat	gtg	atc	gca	aga		912
Arg	Asn	Val	Pro	Pro	Leu	Thr	Ala	Asn	Gln	Glu	Tyr	Val	Ile	Ala	Arg		
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tta	gtg	tggt	tac	caa	gat	gga	tat	gaa	caa	cct	tct	gag	gaa	gac	cta		960
Leu	Val	Trp	Tyr	Gln	Asp	Gly	Tyr	Glu	Gln	Pro	Ser	Glu	Glu	Asp	Leu		
305					310					315					320		
cga	agg	ata	atg	ata	agt	aca	cca	gct	gaa	gat	gaa	gct	ctt	gaa	ttt		1008
Arg	Arg	Ile	Met	Ile	Ser	Thr	Pro	Ala	Glu	Asp	Glu	Ala	Leu	Glu	Phe		
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## FC-4-1.ST25.txt

cgg cat ata act gaa att acc ata ctt act gtg cag ctt ata gtg gaa	1056
Arg His Ile Thr Glu Ile Thr Ile Leu Thr Val Gln Leu Ile Val Glu	
340 345 350	
ttt gca aag ggt tta cca gct ttt acc aaa ata cca caa gaa gat caa	1104
Phe Ala Lys Gly Leu Pro Ala Phe Thr Lys Ile Pro Gln Glu Asp Gln	
355 360 365	
ata aca tta tta aag gca tgt tca agt gaa gta atg atg ctg cga atg	1152
Ile Thr Leu Leu Lys Ala Cys Ser Ser Glu Val Met Met Leu Arg Met	
370 375 380	
gct cgg cgg tac gat gca gtg tcg gat tca atc tta ttc gcg aat aat	1200
Ala Arg Arg Tyr Asp Ala Val Ser Asp Ser Ile Leu Phe Ala Asn Asn	
385 390 395 400	
cgt tca tat act cgt gac tcc tat aaa atg gct ggt atg gca gat aca	1248
Arg Ser Tyr Thr Arg Asp Ser Tyr Lys Met Ala Gly Met Ala Asp Thr	
405 410 415	
ata gaa gat cta ttg cat ttt tgt cga cag atg tat act atg act gta	1296
Ile Glu Asp Leu Leu His Phe Cys Arg Gln Met Tyr Thr Met Thr Val	
420 425 430	
gac aat gtg gag tat gca cta ata aca gca att gtg att ttt tca gat	1344
Asp Asn Val Glu Tyr Ala Leu Ile Thr Ala Ile Val Ile Phe Ser Asp	
435 440 445	
cga cct gga ttg gaa caa gca gat ctt gtg gaa caa att caa agt tat	1392
Arg Pro Gly Leu Glu Gln Ala Asp Leu Val Glu Gln Ile Gln Ser Tyr	
450 455 460	
tac atc aaa aca tta aag tgc tac att ttg aat cga cat agt ggt gac	1440
Tyr Ile Lys Thr Leu Lys Cys Tyr Ile Leu Asn Arg His Ser Gly Asp	
465 470 475 480	
cct aag tgt gga ata ttg ttt gcc aaa ctt ctt tct att ctt act gaa	1488
Pro Lys Cys Gly Ile Leu Phe Ala Lys Leu Leu Ser Ile Leu Thr Glu	
485 490 495	
tta cgc acg tta gga aat caa aac tca gaa atg tgt ttt gca ctg aaa	1536
Leu Arg Thr Leu Gly Asn Gln Asn Ser Glu Met Cys Phe Ala Leu Lys	
500 505 510	
ttg aag aac aga aaa ctt cct aga ttt tta gaa gaa att tgg gat gtg	1584
Leu Lys Asn Arg Lys Leu Pro Arg Phe Leu Glu Glu Ile Trp Asp Val	
515 520 525	
aca gat aat gtg cct cct acg ata gac agc atg cat agt gta tcg gag	1632
Thr Asp Asn Val Pro Pro Thr Ile Asp Ser Met His Ser Val Ser Glu	
530 535 540	
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<210> 9  
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&lt;212&gt; PRT

&lt;213&gt; Ctenocephalides felis

&lt;400&gt; 9

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 20 25 30

Leu Ala Ala Leu Ser Pro Ala Ser Leu Gly Ser Pro Glu Thr Tyr Ala  
 35 40 45

Glu Leu Asp Leu Trp Val Tyr Glu Glu Ala Gly Leu His Pro Gly Ser  
 50 55 60

Gly Val Gln Gly Cys Gly Ala Val Ala Ala Leu Pro Ser Ile Ala Thr  
 65 70 75 80

Gln Val Pro Leu Gly Leu Pro Ala Met Asp Leu Pro His Thr Pro Arg  
 85 90 95

Ser Asp Ser Ala Gly Ser Ile Ser Ser Gly Arg Glu Asp Leu Ser Pro  
 100 105 110

Pro Ser Ser Leu Asn Gly Tyr Ser Ala Asp Gly Cys Glu Ala Lys Lys  
 115 120 125

Ala Lys Lys Gly Pro Ala Pro Arg Gln Gln Glu Glu Leu Cys Leu Val  
 130 135 140

Cys Gly Asp Arg Ala Ser Gly Tyr His Tyr Asn Ala Leu Thr Cys Glu  
 145 150 155 160

Gly Cys Lys Gly Phe Phe Arg Arg Ser Val Thr Lys Asn Ala Val Tyr  
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Val Cys Lys Phe Gly His Thr Cys Glu Met Asp Met Tyr Met Arg Arg  
 180 185 190

Lys Cys Gln Glu Cys Arg Leu Lys Lys Cys Leu Ala Val Gly Met Arg  
 195 200 205

Pro Glu Cys Val Val Pro Glu Asn Gln Cys Ala Met Lys Arg Lys Glu  
 210 215 220

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Lys Lys Ala Gln Lys Glu Lys Asp Ile Gly Pro Ile Ser Gly Thr Val  
 225 230 235 240  
 Gly Lys Ser Ala Ala Pro Leu Ala Asn Ser Ala Leu Leu Gln Lys Pro  
 245 250 255  
 Asp Ile Leu Pro Ala Val Met Lys Cys Asp Pro Leu Pro Pro Glu Ala  
 260 265 270  
 Thr Lys Val Lys Phe Leu Ser Asp Lys Ile Leu Ala Glu Asn Arg Ile  
 275 280 285  
 Arg Asn Val Pro Pro Leu Thr Ala Asn Gln Glu Tyr Val Ile Ala Arg  
 290 295 300  
 Leu Val Trp Tyr Gln Asp Gly Tyr Glu Gln Pro Ser Glu Glu Asp Leu  
 305 310 315 320  
 Arg Arg Ile Met Ile Ser Thr Pro Ala Glu Asp Glu Ala Leu Glu Phe  
 325 330 335  
 Arg His Ile Thr Glu Ile Thr Ile Leu Thr Val Gln Leu Ile Val Glu  
 340 345 350  
 Phe Ala Lys Gly Leu Pro Ala Phe Thr Lys Ile Pro Gln Glu Asp Gln  
 355 360 365  
 Ile Thr Leu Leu Lys Ala Cys Ser Ser Glu Val Met Met Leu Arg Met  
 370 375 380  
 Ala Arg Arg Tyr Asp Ala Val Ser Asp Ser Ile Leu Phe Ala Asn Asn  
 385 390 395 400  
 Arg Ser Tyr Thr Arg Asp Ser Tyr Lys Met Ala Gly Met Ala Asp Thr  
 405 410 415  
 Ile Glu Asp Leu Leu His Phe Cys Arg Gln Met Tyr Thr Met Thr Val  
 420 425 430  
 Asp Asn Val Glu Tyr Ala Leu Ile Thr Ala Ile Val Ile Phe Ser Asp  
 435 440 445  
 Arg Pro Gly Leu Glu Gln Ala Asp Leu Val Glu Gln Ile Gln Ser Tyr

450  
Tyr Ile Lys Thr Leu Lys Cys Tyr Ile Leu Asn Arg His Ser Gly Asp  
465 470 475 480

Pro Lys Cys Gly Ile Leu Phe Ala Lys Leu Leu Ser Ile Leu Thr Glu  
485 490 495

Leu Arg Thr Leu Gly Asn Gln Asn Ser Glu Met Cys Phe Ala Leu Lys  
500 505 510

Leu Lys Asn Arg Lys Leu Pro Arg Phe Leu Glu Glu Ile Trp Asp Val  
515 520 525

Thr Asp Asn Val Pro Pro Thr Ile Asp Ser Met His Ser Val Ser Glu  
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Asn Phe Tyr Asn Asn Glu Ser Asn Gly Thr Ser Asp Ser Thr Pro Met  
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<212> DNA  
<213> Ctenocephalides felis

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tctaggaagt tttctgttct tcaatttcag tgcaaaacac atttctgagt tttgatttcc 180  
taacgtgcgt aattcagtaa gaatagaaag aagtttggca aacaatattc cacacttagg 240  
gtcaccacta tgtcgattca aaatgtagca ctttaatggt ttgatgtaat aactttgaat 300  
ttgttccaca agatctgctt gttccaatcc aggtcgatct gaaaaaatca caattgctgt 360  
tattagtgc tactccacat tgtctacagt catagtatac atctgtcgac aaaaatgcaa 420  
tagatcttct attgtatctg ccataccagc cattttatag gagtcacgag tatatgaacg 480  
attattcgcg aataagattg aatccgacac tgcacgtac cgccgagcca ttgcagcat 540  
cattacttca cttgaacatg cctttaataa tgttatttga tcttcttggt gtattttggt 600  
aaaagctggt aaaccctttg caaattccac tataagctgc acagtaagta tggtaatttc 660  
agttatatgc cgaaattcaa gagcttcac ttcagctggt gtacttatca ttatccttcg 720  
taggtcttcc tcagaagggt gttcatatcc atcttggtac cacactaatc ttgcgatcac 780

FC-4-1.ST25.txt

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aggcaaaata tcaggcttct gaagtaatgc agaattcgct aaggagcag cagattttcc	960
aacggtacct gatattggtc cgatgtcctt ttccttctgt gccttctttt ctttcgctt	1020
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cttgagccta cattcctgac atttgcgctg catatacatg tccatttcgc acgtgtgccc	1140
aaacttgcac acgtacacgg cattcttagt cacacttcgt cggaaaaaac ctttgcattc	1200
ttcacaagta agagcgttgt aatgatatcc ggaggcacgg tcgccgcaca caagacatag	1260
ttcctcctgc tgccgcggcg cgggcccttt cttggccttc ttcgcttcgc agccatctgc	1320
tgaatagccg ttcaaagaac taggcggtga caggctctct cgtcctgatg agatgctacc	1380
cgcactgtca ctccgaggcg tgtgcggtag gtccatagcg ggcaatccta gggggacctg	1440
tgtcgcgac gatggcaagg cggcgaccgc accgcacctt tgcacacctg aacctggatg	1500
taagccagct tcctcgtaca cccacaaatc cagctcggca tatgtctcgg gcgaacctaa	1560
cgaagccgga ctcaacgcag ccaggcgcc accagaagac gacgttacct caccagatgc	1620
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 <212> DNA  
 <213> Ctenocephalides felis

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tgcaaatctt tctgatggaa ctgttttgaa cgaagttata catgaagatc ttctgcttaa	180
atgtgaaccc tctactagcg tggacgcatt atctaattga gctttcggta gcaagcagca	240
gcacaaagtc gaagaatgga agcgatcacc tagtcccagt ttgacgaaca gccatgtgcc	300
acctctcaca ccatcaccag gccatccag cttaccatat tcgacattgt ctaatggcta	360
ttcttcgcca atgtcgtcag gcagctgcga tccctatagc cctaattgga aaatgggacg	420
agaagacctg tcaccgcta gttctttgaa cggctattca gcagatggct gcgaagcgaa	480
gaaggccaag aaagggccgg cgccgcggca acaggaggaa ctatgtcttg tgtgcggcga	540
ccgtgcctcc ggatatcatt acaacgctct tacttgtgaa ggatgcaaag ggtttttccg	600
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acatgt

666

<210> 12  
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 gcacggctgc cgcacacaag acatagttcc tctgttgcc gcggcgccgg ccctttcttg 180  
 gccttcttcg cttcgcagcc atctgctgaa tagccgttca aagaactagg cggtgacagg 240  
 tcttctcgtc ccattttacc attagggcta tagggatcgc agctgcctga cgacattggc 300  
 gaagaatagc cattagacaa tgtcgaatat ggtaagctgg atgggcctgg tgatggtgtg 360  
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 acatgtattg acaaaaaata agtaaaaaaa tagttcattg aatataatac ggtttcattc 180  
 gta atg ttt cga gcg gtt aca aat ctt gca aat tct tct gat gga act 228  
 Met Phe Arg Ala Val Thr Asn Leu Ala Asn Ser Ser Asp Gly Thr  
 1 5 10 15  
 gtt ttg aac gaa gtt ata cat gaa gat ctt ctg ctt aaa tgt gaa ccc 276  
 Val Leu Asn Glu Val Ile His Glu Asp Leu Leu Leu Lys Cys Glu Pro  
 20 25 30

## FC-4-1.ST25.txt

tct act agc gtg gac gca tta tct aat gga gct ttc ggt agc aag cag	324
Ser Thr Ser Val Asp Ala Leu Ser Asn Gly Ala Phe Gly Ser Lys Gln	
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cag cac aaa gtc gaa gaa tgg aag cga tca cct agt ccc agt ttg acg	372
Gln His Lys Val Glu Glu Trp Lys Arg Ser Pro Ser Pro Ser Leu Thr	
50 55 60	
aac agc cat gtg cca cct ctc aca cca tca cca ggc cca tcc agc tta	420
Asn Ser His Val Pro Pro Leu Thr Pro Ser Pro Gly Pro Ser Ser Leu	
65 70 75	
cca tat tcg aca ttg tct aat ggc tat tct tcg cca atg tcg tca ggc	468
Pro Tyr Ser Thr Leu Ser Asn Gly Tyr Ser Ser Pro Met Ser Ser Gly	
80 85 90 95	
agc tgc gat ccc tat agc cct aat ggt aaa atg gga cga gaa gac ctg	516
Ser Cys Asp Pro Tyr Ser Pro Asn Gly Lys Met Gly Arg Glu Asp Leu	
100 105 110	
tca ccg cct agt tct ttg aac ggc tat tca gca gat ggc tgc gaa gcg	564
Ser Pro Pro Ser Ser Leu Asn Gly Tyr Ser Ala Asp Gly Cys Glu Ala	
115 120 125	
aag aag gcc aag aaa ggg ccg gcg ccg cgg cag cag gag gaa cta tgt	612
Lys Lys Ala Lys Lys Gly Pro Ala Pro Arg Gln Gln Glu Glu Leu Cys	
130 135 140	
ctt gtg tgc ggc gac cgt gcc tcc gga tat cat tac aac gct ctt act	660
Leu Val Cys Gly Asp Arg Ala Ser Gly Tyr His Tyr Asn Ala Leu Thr	
145 150 155	
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Cys Glu Gly Cys Lys Gly Phe Phe Arg Arg Ser Val Thr Lys Asn Ala	
160 165 170 175	
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Val Tyr Val Cys Lys Phe Gly His Thr Cys Glu Met Asp Met Tyr Met	
180 185 190	
cga cgc aaa tgt cag gaa tgt agg ctc aag aaa tgt ttg gct gtc gga	804
Arg Arg Lys Cys Gln Glu Cys Arg Leu Lys Lys Cys Leu Ala Val Gly	
195 200 205	
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210 215 220	
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Lys Glu Lys Lys Ala Gln Lys Glu Lys Asp Ile Gly Pro Ile Ser Gly	
225 230 235	
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Thr Val Gly Lys Ser Ala Ala Pro Leu Ala Asn Ser Ala Leu Leu Gln	
240 245 250 255	
aag cct gat att ttg cct gcg gtc atg aaa tgc gac cca tta cct cca	996
Lys Pro Asp Ile Leu Pro Ala Val Met Lys Cys Asp Pro Leu Pro Pro	

260	265	270	
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gat aca ata gaa gat cta ttg cat ttt tgt cga cag atg tat act atg Asp Thr Ile Glu Asp Leu Leu His Phe Cys Arg Gln Met Tyr Thr Met 420 425 430			1476
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agt tat tac atc aaa aca tta aag tgc tac att ttg aat cga cat agt Ser Tyr Tyr Ile Lys Thr Leu Lys Cys Tyr Ile Leu Asn Arg His Ser 465 470 475			1620
ggt gac cct aag tgt gga ata ttg ttt gcc aaa ctt ctt tct att ctt Gly Asp Pro Lys Cys Gly Ile Leu Phe Ala Lys Leu Leu Ser Ile Leu 480 485 490 495			1668
act gaa tta cgc acg tta gga aat caa aac tca gaa atg tgt ttt gca			1716

## FC-4-1.ST25.txt

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Asp	Val	Thr	Asp	Asn	Val	Pro	Pro	Thr	Ile	Asp	Ser	Met	His	Ser	Val	
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Ser	Glu	Asn	Phe	Tyr	Asn	Asn	Glu	Ser	Asn	Gly	Thr	Ser	Asp	Ser	Thr	
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Pro	Met															
560																
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FC-4-1.ST25.txt

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<213> Ctenocephalides felis

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35 40 45

His Lys Val Glu Glu Trp Lys Arg Ser Pro Ser Pro Ser Leu Thr Asn  
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FC-4-1.ST25.txt

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Cys Asp Pro Tyr Ser Pro Asn Gly Lys Met Gly Arg Glu Asp Leu Ser  
100 105 110

Pro Pro Ser Ser Leu Asn Gly Tyr Ser Ala Asp Gly Cys Glu Ala Lys  
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Lys Ala Lys Lys Gly Pro Ala Pro Arg Gln Gln Glu Glu Leu Cys Leu  
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Glu Gly Cys Lys Gly Phe Phe Arg Arg Ser Val Thr Lys Asn Ala Val  
165 170 175

Tyr Val Cys Lys Phe Gly His Thr Cys Glu Met Asp Met Tyr Met Arg  
180 185 190

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195 200 205

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Glu Lys Lys Ala Gln Lys Glu Lys Asp Ile Gly Pro Ile Ser Gly Thr  
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Pro Asp Ile Leu Pro Ala Val Met Lys Cys Asp Pro Leu Pro Pro Glu  
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Ile Arg Asn Val Pro Pro Leu Thr Ala Asn Gln Glu Tyr Val Ile Ala  
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&lt;213&gt; Ctenocephalides felis

&lt;400&gt; 15

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## FC-4-1.ST25.txt

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FC-4-1.ST25.txt

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FC-4-1.ST25.txt

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cac aaa gtc gaa gaa tgg aag cga tca cct agt ccc agt ttg acg aac	192
His Lys Val Glu Glu Trp Lys Arg Ser Pro Ser Pro Ser Leu Thr Asn	
50 55 60	
agc cat gtg cca cct ctc aca cca tca cca ggc cca tcc agc tta cca	240
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65 70 75 80	
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Tyr Ser Thr Leu Ser Asn Gly Tyr Ser Ser Pro Met Ser Ser Gly Ser	
85 90 95	
tgc gat ccc tat agc cct aat ggt aaa atg gga cga gaa gac ctg tca	336
Cys Asp Pro Tyr Ser Pro Asn Gly Lys Met Gly Arg Glu Asp Leu Ser	
100 105 110	
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Pro Pro Ser Ser Leu Asn Gly Tyr Ser Ala Asp Gly Cys Glu Ala Lys	
115 120 125	
aag gcc aag aaa ggg ccg gcg ccg cgg cag cag gag gaa cta tgt ctt	432
Lys Ala Lys Lys Gly Pro Ala Pro Arg Gln Gln Glu Glu Leu Cys Leu	
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Val Cys Gly Asp Arg Ala Ser Gly Tyr His Tyr Asn Ala Leu Thr Cys	
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225 230 235 240	
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245 250 255	
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## FC-4-1.ST25.txt

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FC-4-1.ST25.txt

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FC-4-1.ST25.txt

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tgaatagccg ttcaaagaac taggcggtga caggctcttct cgtccattt taccattagg	1380
gctataggga tcgcagctgc ctgacgacat tggcgaagaa tagccattag acaatgtcga	1440
atatggtaag ctggatgggc ctggtgatgg tgtgagaggt ggcacatggc tgttcgtcaa	1500
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tccattagat aatgcgtcca cgctagtaga gggttcacat ttaagcagaa gatcttcattg	1620
tataacttcg ttcaaaacag ttccatcaga agaatttgca agatttgtaa ccgctcgaaa	1680
cat	1683



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<210> 19
<211> 160
<212> DNA
<213> Ctenocephalides felis

<400> 19
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ctgtcgagag gatagaaatt gtttgatcga caaaaggcag agaaatcgat gtcagttctg      120
tcgatatcag aaatgtctcg cctgtggaat gaaacgagaa                               160

<210> 20
<211> 160
<212> DNA
<213> Ctenocephalides felis

<400> 20
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ctgccttttg tcgatcaaac aatttctatc ctctcgacag gcatacgtca gatcttttcg      120
taccgtccgt ttgaaaaatc ccttacaacc ttcgcaactg                               160

<210> 21
<211> 2149
<212> DNA
<213> Ctenocephalides felis

<400> 21
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aatgcctaaa gtcgcggaaca gtcaagtgat tgaagtgatg gtatgcgcgc gactcggttt      120
gttttgacgt gttcgaagat gaacgatatt ttaaatatct tgtgtttagt tttagtctcg      180
agataatctt tgtgctgtgt gataagagtt gtgctttcat aaaaaggaat tgtttattag      240
atcttgaatg acagtgcctc atgtgggaga tgacatactg aacgcattag tttatatggt      300
gcttataatt gagtatagga ataaactggt aatttcaatt ttttggtaac tccaaatggt      360
acctcaaaaa cttaaagtaa ggggtcaaata taaaaaaaag tgtcattaag aaattcaaca      420
tgactagtac acatatcagt gagtgagttt atattagaaa tgaaggagac gcataaattg      480
gtaacttaat taagcattac aatcaactgg gaataaataa atatatcttc taaaatgatg      540
aaaaaagaga agcctatgat gtctgtgacg gctttgattc aaggagccgc tcagaatcaa      600
atatggggac gaggattatc tggccttaca ggcttggccc tcgaccaagg gctgtcaatg      660
agctcgatgg gaccgctctc accgccggat atgaaaccgg atcctgcgct actgaacggc      720
ggcttttcgc ccggcagtg gggcgagtt gtcggcagtc ccgctagtcc gccttttggg      780
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FC-4-1.ST25.txt

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cctccaaatc atccttttgag cgggtcaaaa catctgtgct ccatatgcgg agatagggct 900
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cagagaaatc gatgtcagtt ctgtcgatat cagaaatgtc tcgcctgtgg aatgaaacga 1080
gaagccgtgc aggaagaacg acaacgagga gcaaagaata atgaagaaag caacccgaca 1140
agttctgttc gtgatttaac ggtagaaaga attttagaag cagaacaaag gagtgaact 1200
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aagcaattat atatcaaata tattaatgca tttttattat ttaacatttg tgttcataat 2100
tatttaatat agttattaat ttagattaaa aaaaaaaaaa aaaaaaaaaa 2149

```

```

<210> 22
<211> 2149
<212> DNA
<213> Ctenocephalides felis

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<400> 22
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aaatgttaaa taataaaaat gcattaatat atttgatata taattgcttt gaatagatta 120
cttattcaat atataaaaga gttggaagct tttaacgtga ttcacagact aattcaatac 180
atcaacatta tgaaagcaaa atttaaaaaa aataacaatt tgaaaacaat tgtaaaacaa 240

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## FC-4-1.ST25.txt

tatttgcaac atttcactta gtcctaggtg cccaagcca tcgtcaaaat ttcaagtgtt	300
cttcaagttt ctaaattaca tatattaaat taagtcatac taccgtagac aagactgcgc	360
taacattcaa gttagcattt tttttaaatc aagcattaca ataaatttca gaaacttttg	420
ttatatTTTTT acatcattta ccaggattaa acagtattat agccttcaaa cagcctaatt	480
ctgctctgtc caaatccatt cttctcattt tgacacttaa ttctgacagt acccgatcga	540
aaataggtcc gacgccagcc tggattgcac tattccgatg taacgtcata ccaggaaaga	600
aacacattaa ttcaggcggg cctgggtggag cgcgtctcct tgttgaagta tctactagaca	660
tactggacgt acttgtttct gcatcggatt ctagatactc aatacttctc caggctatag	720
atgctataag taattcattc caggctgtct tgagtaacgt tacttgatcc tctaattgta	780
aagcactaaa atgcggcatg caccttgctg attgtactaa ctgatataac tgtttatttg	840
cttgctgaca cagactggat acagggccct tgtatctagg aggcaccatg gatgaaggctc	900
ctactcgcaa atattgtatc gacaattccg ggtccgtcgc aacatttcga gtttactcc	960
tttgttctgc ttctaaaatt ctttctaccg ttaaatacag aacagaactt gtcgggttgc	1020
tttcttcatt attctttgct cctcgttgtc gttcttcctg cacggcttct cgtttcattc	1080
cacagggcag acattttctga tatcgacaga actgacatcg atttctctgc cttttgtcga	1140
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gactagcggg actgccgaca actgcgccgc cactgccggg cgaaaagccg ccgttcagta	1440
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aagatatatt tattttattcc cagttgattg taatgcttaa ttaagttacc aatttatgcy	1680
tctccttcatt ttctaataa aactcactca ctgatatgtg tactagtcat gttgaatttc	1740
ttaatgacac ttttttttat atttgaccct tactttaagt ttttgaggta acatttgag	1800
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taatgcgttc agtatgtcat ctcccacatg gggcactgtc attcaaaatc taataaacia	1920
ttccttttta tgaaagcaca actcttatca cacagcacia aaattatctc gagactaaaa	1980

FC-4-1.ST25.txt

ctaaacacaa aatattttaa atatcggttca tcttcgaaca cgtcaaaaca aaccgagtcg	2040
cgcgcatacc atcacttcaa tcacttgact gtccgcgact ttaggcattt tatgcagaaa	2100
acaattacaa atgcgttcca tgcgacgcgt ttcgatgcta tcgccgcgg	2149

<210> 23  
 <211> 1421  
 <212> DNA  
 <213> Ctenocephalides felis

<400> 23	
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aaattgtttg atcgacaaaa ggcagagaaa tcgatgtcag ttctgtcgat atcagaaatg	180
tctcgctgtt ggaatgaaac gagaagccgt gcaggaagaa cgacaacgag gagcaaagaa	240
taatgaagaa agcaaccgga caagttctgt tcgtgattta acggtagaaa gaattttaga	300
agcagaacaa aggagtgaag ctcgaaatgt tgcgacggac ccggaattgt cgatacaata	360
tttgcgagta ggaccttcac ccatggtgcc tcttagatac aagggccctg tatccagtct	420
gtgtcagcaa gcaaataaac agttatatca gttagtacaa tacgcaagggt gcatgccgca	480
ttttagtgtt ttacaattag aggatcaagt aacgttactc agagcagcct ggaatgaatt	540
acttatagca tctatagcct ggagaagtat tgagtatcta gaatccgatg cagaaacaag	600
tacgtccagt atgtctagt atacttcaac aaggagacgc gctccaccag gaccgcctga	660
attaatgtgt ttctttcctg gtatgacgtt acatcggaat agtgcaatcc aggctggcgt	720
cggacctatt ttcgatcggg tactgtcaga attaatgtgtc aaaatgagaa gaatggattt	780
ggacagagca gaattaggct gtttgaaggc tataatactg tttaatcctg atattcgagg	840
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gcattgcagg acgcagcatc cagcgggaag gggtcgtttc gcagccctgc tgcttcgcct	960
gccagctctg aggtcaatct ctttgaaatg tctcgatcac ctgtttttct tcagattgat	1020
tggcgatagc ccgcttgaga gttttcttgt ggatttactc gaggccggac ccatcggttg	1080
agccgattca tggataaaaag ataagtttta tgtattaaga tgagaataag taaatattct	1140
gcaaagttat tttttctgca cgaatatctc tacaagcacg cacttgggat attgattgtc	1200
tcttgtgac ttttgaggtg gcggggagga tacgaaccag tgatatttta aaatattttt	1260
aattattaga gattaggata gcggtataag tactgtaatg catatataca tatatgcttt	1320
tgatttatat tagaagtttt tctgcatcat ccagtgaatt aaaataagat ataataagga	1380

aaagtcata tataaaaaaa aaaaaaaaaa aaaaaaaaaa a 1421

<210> 24  
 <211> 1421  
 <212> DNA  
 <213> Ctenocephalides felis

<400> 24  
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 gcattacagt acttataccg ctatcctaata ctctaataat taaaaatatt ttaaaatata 180  
 actgggtcgt atcctccccg ccacctcaaa agatcacaag agacaatcaa tatcccaagt 240  
 gcgtgcttgt agaaatatct gtgcagaaaa aataactttg cagaatattt acttattctc 300  
 atcttaatac ataaaactta tcttttatcc atgaatcggc tcaaccgatg ggtccggcct 360  
 cgagtaaata cacaagaaaa ctctcaagcg gcgtatcgcc aatcaatctg aagaaaaaca 420  
 ggtgatcgag acatttcaaa gagattgacc tcagagctgg caggcgaagc agcagggctg 480  
 cgaaacgacc ctcttcgct ggatgctgcg tctgcaatg ctctccagg cacgcgtaaa 540  
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 acagtattat agccttcaaa cagcctaatt ctgctctgtc caaatccatt cttctcattt 660  
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 tattccgatg taacgtcata ccaggaaaga aacacattaa ttcaggcggg cctgggtggag 780  
 cgcgctcct tgttgaagta tctactagaca tactggacgt acttgtttct gcacgggatt 840  
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 attgtactaa ctgatataac tgtttatttg cttgctgaca cagactggat acagggccct 1020  
 tgtatctagg aggcaccatg gatgaaggc ctactcgcaa atattgtatc gacaattccg 1080  
 ggtccgtcgc aacatttcga gtttctactc tttgttctgc ttctaaaatt ctttctaccg 1140  
 ttaaatcacg aacagaactt gtcgggttgc tttcttcatt attctttgct cctcgttgct 1200  
 gttcttctcg cacggcttct cgtttcattc cacaggcgag acatttctga tatcgacaga 1260  
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 acgtcagatc ttttcgtacc gtccgtttga aaaatccctt acaaccttcg caactgtaaa 1380  
 caccataatg cttcccgga gccctatctc cctcgtgccg c 1421

<210> 25

&lt;211&gt; 819

&lt;212&gt; DNA

&lt;213&gt; Ctenocephalides felis

&lt;400&gt; 25

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tgcaggaatt cggcacgaga ttttatgtag gttacaataa attttaaatt aaaattatgt      120
tgcacaatta cttttaacaa gttttttatt ttatcgttaa gtagtgcgtt atgttaattc      180
aaaataaatc gtttaatgaa cgaaattcat gagtttggtg aaggaaatag ttgatagttc      240
atcgacctta agagtgcacg tacgcggcca tgtttataca aatattaaat aatgttgctt      300
tattaaagtt cagttcaaaa aagctaaaat aagtgaaaaa gtgatactgc tagtttagtg      360
gaacaataat ggaaagtgcg gacagaggct tggccttcga ccaagggctg tcaatgagct      420
cgatgggacc gctctcaccg ccggatatga aaccggatcc tgtgctactg aacggcggct      480
tttcgcccg cagtggcggc gcagttgtcg gcagtccgc tagtccgcct ttcggtcaaa      540
atcacacaat agtatcagga aacacggcca cgggcgccca aacgaaatca ccataccctc      600
caaatcatcc tttgagcggy tcaaaacatc tgtgctccat atgcggagat agggcttccg      660
ggaagcatta tgggtgtttac agttgcgaag gttgtaaggg atttttcaaa cggacggtac      720
gaaaagatct gacgtatgcc tgtcgagaag atagaaattg tttgatcgac aaaaggcaga      780
gaaatcgatg tcagttctgt cgatatcaga aatgtctcg                               819

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&lt;210&gt; 26

&lt;211&gt; 1749

&lt;212&gt; DNA

&lt;213&gt; Ctenocephalides felis

&lt;220&gt;

&lt;221&gt; CDS

&lt;222&gt; (306)..(1652)

&lt;223&gt;

&lt;400&gt; 26

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tagtggaccc cccgggctgc aggaattcgg cacgagattt taaattaaaa ttatgttgca      60
caattacttt taacaagttt tttattttat cgtaaagtag tgcgttatgt taattcaaaa      120
taaatcgttt aatgaacgaa attcatgagt ttgttgaagg aaatagttga tagttcatcg      180
accttacaga gtgacagtac gcggccatgt ttatacaaat attaaataat gttgctttat      240
taaagttcag ttcaaaaaag ctaaaataag tgaaaaagtg atactgctag tttagtggaa      300
caata atg gaa agt gca gac aga ggc ttg gcc ctc gac caa ggg ctg tca      350
  Met Glu Ser Ala Asp Arg Gly Leu Ala Leu Asp Gln Gly Leu Ser
    1             5             10             15

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## FC-4-1.ST25.txt

atg agc tcg atg gga ccg ctc tca ccg ccg gat atg aaa ccg gat cct	398
Met Ser Ser Met Gly Pro Leu Ser Pro Pro Asp Met Lys Pro Asp Pro	
20 25 30	
gcg cta ctg aac ggc ggc ttt tcg ccc ggc agt ggc ggc gca gtt gtc	446
Ala Leu Leu Asn Gly Gly Phe Ser Pro Gly Ser Gly Gly Ala Val Val	
35 40 45	
ggc agt ccc gct agt ccg cct ttt ggt caa aat cac aca ata gta tca	494
Gly Ser Pro Ala Ser Pro Pro Phe Gly Gln Asn His Thr Ile Val Ser	
50 55 60	
gga aac acg gcc acg ggc gcc caa acg aaa tca cca tac cct cca aat	542
Gly Asn Thr Ala Thr Gly Ala Gln Thr Lys Ser Pro Tyr Pro Pro Asn	
65 70 75	
cat cct ttg agc ggg tca aaa cat ctg tgc tcc ata tgc gga gat agg	590
His Pro Leu Ser Gly Ser Lys His Leu Cys Ser Ile Cys Gly Asp Arg	
80 85 90 95	
gct tcc ggg aag cat tat ggt gtt tac agt tgc gaa ggt tgt aag gga	638
Ala Ser Gly Lys His Tyr Gly Val Tyr Ser Cys Glu Gly Cys Lys Gly	
100 105 110	
ttt ttc aaa cgg acg gta cga aaa gat ctg acg tat gcc tgt cga gag	686
Phe Phe Lys Arg Thr Val Arg Lys Asp Leu Thr Tyr Ala Cys Arg Glu	
115 120 125	
gat aga aat tgt ttg atc gac aaa agg cag aga aat cga tgt cag ttc	734
Asp Arg Asn Cys Leu Ile Asp Lys Arg Gln Arg Asn Arg Cys Gln Phe	
130 135 140	
tgt cga tat cag aaa tgt ctc gcc tgt gga atg aaa cga gaa gcc gtg	782
Cys Arg Tyr Gln Lys Cys Leu Ala Cys Gly Met Lys Arg Glu Ala Val	
145 150 155	
cag gaa gaa cga caa cga gga gca aag aat aat gaa gaa agc aac ccg	830
Gln Glu Glu Arg Gln Arg Gly Ala Lys Asn Asn Glu Glu Ser Asn Pro	
160 165 170 175	
aca agt tct gtt cgt gat tta acg gta gaa aga att tta gaa gca gaa	878
Thr Ser Ser Val Arg Asp Leu Thr Val Glu Arg Ile Leu Glu Ala Glu	
180 185 190	
caa agg agt gaa act cga aat gtt gcg acg gac ccg gaa ttg tcg ata	926
Gln Arg Ser Glu Thr Arg Asn Val Ala Thr Asp Pro Glu Leu Ser Ile	
195 200 205	
caa tat ttg cga gta gga cct tca tcc atg gtg cct cct aga tac aag	974
Gln Tyr Leu Arg Val Gly Pro Ser Ser Met Val Pro Pro Arg Tyr Lys	
210 215 220	
ggc cct gta tcc agt ctg tgt cag caa gca aat aaa cag tta tat cag	1022
Gly Pro Val Ser Ser Leu Cys Gln Gln Ala Asn Lys Gln Leu Tyr Gln	
225 230 235	
tta gta caa tac gca agg tgc atg ccg cat ttt agt gct tta caa tta	1070
Leu Val Gln Tyr Ala Arg Cys Met Pro His Ser Ala Leu Gln Leu	

FC-4-1.ST25.txt

240	245	250	255	
gag gat caa gta acg tta ctc aga gca gcc tgg aat gaa tta ctt ata				1118
Glu Asp Gln Val Thr Leu Leu Arg Ala Ala Trp Asn Glu Leu Leu Ile				
	260	265	270	
gca tct ata gcc tgg aga agt att gag tat cta gaa tcc gat gca gaa				1166
Ala Ser Ile Ala Trp Arg Ser Ile Glu Tyr Leu Glu Ser Asp Ala Glu				
	275	280	285	
aca agt acg tcc agt atg tct agt gat act tca aca agg aga cgc gct				1214
Thr Ser Thr Ser Ser Met Ser Ser Asp Thr Ser Thr Arg Arg Ala				
	290	295	300	
cca cca gga ccg cct gaa tta atg tgt ttc ttt cct ggt atg acg tta				1262
Pro Pro Gly Pro Pro Glu Leu Met Cys Phe Phe Pro Gly Met Thr Leu				
	305	310	315	
cat cgg aat agt gca atc cag gct ggc gtc gga cct att ttc gat cgg				1310
His Arg Asn Ser Ala Ile Gln Ala Gly Val Gly Pro Ile Phe Asp Arg				
	320	325	330	335
gta ctg tca gaa tta agt gtc aaa atg aga aga atg gat ttg gac aga				1358
Val Leu Ser Glu Leu Ser Val Lys Met Arg Arg Met Asp Leu Asp Arg				
	340	345	350	
gca gaa tta ggc tgt ttg aag gct ata ata ctg ttt aat cct gat att				1406
Ala Glu Leu Gly Cys Leu Lys Ala Ile Ile Leu Phe Asn Pro Asp Ile				
	355	360	365	
cga gga ctg aaa tgt aga cag gaa gtg gat gct tta cga gaa aag gtt				1454
Arg Gly Leu Lys Cys Arg Gln Glu Val Asp Ala Leu Arg Glu Lys Val				
	370	375	380	
tac gcg tgc ctg gac gag cat tgc agg acg cag cat cca gcg gaa gag				1502
Tyr Ala Cys Leu Asp Glu His Cys Arg Thr Gln His Pro Ala Glu Glu				
	385	390	395	
ggt cgt ttc gca gcc ctg ctg ctt cgc ctg cca gct ctg agg tca atc				1550
Gly Arg Phe Ala Ala Leu Leu Leu Arg Leu Pro Ala Leu Arg Ser Ile				
	400	405	410	415
tct ttg aaa tgt ctc gat cac ctg ttt ttc ttc aga ttg att ggc gat				1598
Ser Leu Lys Cys Leu Asp His Leu Phe Phe Phe Arg Leu Ile Gly Asp				
	420	425	430	
acg ccg ctt gag agt ttt ctt gtg gat tta ctc gag gcc gga ccg atc				1646
Thr Pro Leu Glu Ser Phe Leu Val Asp Leu Leu Glu Ala Gly Pro Ile				
	435	440	445	
ggt tga gccgattcat ggataaaaga taagttttat gtattaagat gagaataagt				1702
Gly				
aaatattctg caaagttatt ttttctgcac gaatatttct acaagca				1749

<210> 27  
<211> 448



&lt;212&gt; PRT

&lt;213&gt; Ctenocephalides felis

&lt;400&gt; 27

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 1 5 10 15

Ser Ser Met Gly Pro Leu Ser Pro Pro Asp Met Lys Pro Asp Pro Ala  
 20 25 30

Leu Leu Asn Gly Gly Phe Ser Pro Gly Ser Gly Gly Ala Val Val Gly  
 35 40 45

Ser Pro Ala Ser Pro Pro Phe Gly Gln Asn His Thr Ile Val Ser Gly  
 50 55 60

Asn Thr Ala Thr Gly Ala Gln Thr Lys Ser Pro Tyr Pro Pro Asn His  
 65 70 75 80

Pro Leu Ser Gly Ser Lys His Leu Cys Ser Ile Cys Gly Asp Arg Ala  
 85 90 95

Ser Gly Lys His Tyr Gly Val Tyr Ser Cys Glu Gly Cys Lys Gly Phe  
 100 105 110

Phe Lys Arg Thr Val Arg Lys Asp Leu Thr Tyr Ala Cys Arg Glu Asp  
 115 120 125

Arg Asn Cys Leu Ile Asp Lys Arg Gln Arg Asn Arg Cys Gln Phe Cys  
 130 135 140

Arg Tyr Gln Lys Cys Leu Ala Cys Gly Met Lys Arg Glu Ala Val Gln  
 145 150 155 160

Glu Glu Arg Gln Arg Gly Ala Lys Asn Asn Glu Glu Ser Asn Pro Thr  
 165 170 175

Ser Ser Val Arg Asp Leu Thr Val Glu Arg Ile Leu Glu Ala Glu Gln  
 180 185 190

Arg Ser Glu Thr Arg Asn Val Ala Thr Asp Pro Glu Leu Ser Ile Gln  
 195 200 205

Tyr Leu Arg Val Gly Pro Ser Ser Met Val Pro Pro Arg Tyr Lys Gly  
 210 215 220

FC-4-1.ST25.txt

Pro Val Ser Ser Leu Cys Gln Gln Ala Asn Lys Gln Leu Tyr Gln Leu  
225 230 235 240

Val Gln Tyr Ala Arg Cys Met Pro His Phe Ser Ala Leu Gln Leu Glu  
245 250 255

Asp Gln Val Thr Leu Leu Arg Ala Ala Trp Asn Glu Leu Leu Ile Ala  
260 265 270

Ser Ile Ala Trp Arg Ser Ile Glu Tyr Leu Glu Ser Asp Ala Glu Thr  
275 280 285

Ser Thr Ser Ser Met Ser Ser Asp Thr Ser Thr Arg Arg Arg Ala Pro  
290 295 300

Pro Gly Pro Pro Glu Leu Met Cys Phe Phe Pro Gly Met Thr Leu His  
305 310 315 320

Arg Asn Ser Ala Ile Gln Ala Gly Val Gly Pro Ile Phe Asp Arg Val  
325 330 335

Leu Ser Glu Leu Ser Val Lys Met Arg Arg Met Asp Leu Asp Arg Ala  
340 345 350

Glu Leu Gly Cys Leu Lys Ala Ile Ile Leu Phe Asn Pro Asp Ile Arg  
355 360 365

Gly Leu Lys Cys Arg Gln Glu Val Asp Ala Leu Arg Glu Lys Val Tyr  
370 375 380

Ala Cys Leu Asp Glu His Cys Arg Thr Gln His Pro Ala Glu Glu Gly  
385 390 395 400

Arg Phe Ala Ala Leu Leu Leu Arg Leu Pro Ala Leu Arg Ser Ile Ser  
405 410 415

Leu Lys Cys Leu Asp His Leu Phe Phe Phe Arg Leu Ile Gly Asp Thr  
420 425 430

Pro Leu Glu Ser Phe Leu Val Asp Leu Leu Glu Ala Gly Pro Ile Gly  
435 440 445

<210> 28

&lt;211&gt; 1749

&lt;212&gt; DNA

&lt;213&gt; Ctenocephalides felis

&lt;400&gt; 28

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gtaaattcac aagaaaactc tcaagcggcg tatcgccaat caatctgaag aaaaacaggt	180
gatcgagaca tttcaaagag attgacctca gagctggcag gcgaagcagc agggctgcga	240
aacgacctc ttcgctgga tgctgcgtcc tgcaatgctc gtccaggcac gcgtaaacct	300
tttctcgtaa agcatccact tcctgtctac atttcagtcc tcgaatatca ggattaaaca	360
gtattatagc cttcaaacag cctaattctg ctctgtccaa atccattctt ctcatcttga	420
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tccgatgtaa cgtcatacca ggaaagaaac acattaattc aggcggctcct ggtggagcgc	540
gtctccttgt tgaagtatca ctagacatac tggacgtact tgtttctgca tcggattcta	600
gataactcaat acttctccag gctatagatg ctataagtaa ttcattccag gctgctctga	660
gtaacgttac ttgatcctct aattgtaaag cactaaaatg cggcatgcac cttgcgtatt	720
gtactaactg atataactgt ttatttgcct gctgacacag actggatata gggcccttgt	780
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tcagatcttt tcgtaccgtc cgtttgaaaa atcccttaca accttcgcaa ctgtaaacac	1140
cataatgctt cccggaagcc ctatctccgc atatggagca cagatgtttt gaccgcgtca	1200
aaggatgatt tggagggat ggtgatttcg tttgggcgcc cgtggccgtg tttctgata	1260
ctattgtgtg attttgacca aaaggcggac tagcgggact gccgacaact gcgccgccac	1320
tgccgggcca aaagccgccg ttcagtagcg caggatccgg tttcatatcc ggcggtgaga	1380
gcggtcccat cgagctcatt gacagccctt ggtcgagggc caagcctctg tctgcacttt	1440
ccattattgt tccactaaac tagcagtatc actttttcac ttatttttagc ttttttgaac	1500
tgaactttta taaagcaaca ttatttaata tttgtataaa catggccgcg tactgtcact	1560
ctgtaaggtc gatgaactat caactatttc cttcaacaaa ctcatagaatt tcgttcatta	1620

## FC-4-1.ST25.txt

aacgatttat tttgaattaa cataacgcac tacttaacga taaaataaaa aacttggttaa 1680  
aagtaattgt gcaacataat tttaatttaa aatctcgtgc cgaattcctg cagccccggg 1740  
ggtccacta 1749

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<212> DNA  
<213> Ctenocephalides felis

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<222> (1)..(1344)  
<223>

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1 5 10 15  
agc tcg atg gga ccg ctc tca ccg ccg gat atg aaa ccg gat cct gcg 96  
Ser Ser Met Gly Pro Leu Ser Pro Pro Asp Met Lys Pro Asp Pro Ala  
20 25 30  
cta ctg aac ggc ggc ttt tcg ccc ggc agt ggc ggc gca gtt gtc ggc 144  
Leu Leu Asn Gly Gly Phe Ser Pro Gly Ser Gly Gly Ala Val Val Gly  
35 40 45  
agt ccc gct agt ccg cct ttt ggt caa aat cac aca ata gta tca gga 192  
Ser Pro Ala Ser Pro Pro Phe Gly Gln Asn His Thr Ile Val Ser Gly  
50 55 60  
aac acg gcc acg ggc gcc caa acg aaa tca cca tac cct cca aat cat 240  
Asn Thr Ala Thr Gly Ala Gln Thr Lys Ser Pro Tyr Pro Pro Asn His  
65 70 75 80  
cct ttg agc ggg tca aaa cat ctg tgc tcc ata tgc gga gat agg gct 288  
Pro Leu Ser Gly Ser Lys His Leu Cys Ser Ile Cys Gly Asp Arg Ala  
85 90 95  
tcc ggg aag cat tat ggt gtt tac agt tgc gaa ggt tgt aag gga ttt 336  
Ser Gly Lys His Tyr Gly Val Tyr Ser Cys Glu Gly Cys Lys Gly Phe  
100 105 110  
ttc aaa cgg acg gta cga aaa gat ctg acg tat gcc tgt cga gag gat 384  
Phe Lys Arg Thr Val Arg Lys Asp Leu Thr Tyr Ala Cys Arg Glu Asp  
115 120 125  
aga aat tgt ttg atc gac aaa agg cag aga aat cga tgt cag ttc tgt 432  
Arg Asn Cys Leu Ile Asp Lys Arg Gln Arg Asn Arg Cys Gln Phe Cys  
130 135 140  
cga tat cag aaa tgt ctc gcc tgt gga atg aaa cga gaa gcc gtg cag 480  
Arg Tyr Gln Lys Cys Leu Ala Cys Gly Met Lys Arg Glu Ala Val Gln  
145 150 155 160

## FC-4-1.ST25.txt

gaa gaa cga caa cga gga gca aag aat aat gaa gaa agc aac ccg aca	528
Glu Glu Arg Gln Arg Gly Ala Lys Asn Asn Glu Glu Ser Asn Pro Thr	
165 170 175	
agt tct gtt cgt gat tta acg gta gaa aga att tta gaa gca gaa caa	576
Ser Ser Val Arg Asp Leu Thr Val Glu Arg Ile Leu Glu Ala Glu Gln	
180 185 190	
agg agt gaa act cga aat gtt gcg acg gac ccg gaa ttg tcg ata caa	624
Arg Ser Glu Thr Arg Asn Val Ala Thr Asp Pro Glu Leu Ser Ile Gln	
195 200 205	
tat ttg cga gta gga cct tca tcc atg gtg cct cct aga tac aag ggc	672
Tyr Leu Arg Val Gly Pro Ser Ser Met Val Pro Pro Arg Tyr Lys Gly	
210 215 220	
cct gta tcc agt ctg tgt cag caa gca aat aaa cag tta tat cag tta	720
Pro Val Ser Ser Leu Cys Gln Gln Ala Asn Lys Gln Leu Tyr Gln Leu	
225 230 235 240	
gta caa tac gca agg tgc atg ccg cat ttt agt gct tta caa tta gag	768
Val Gln Tyr Ala Arg Cys Met Pro His Phe Ser Ala Leu Gln Leu Glu	
245 250 255	
gat caa gta acg tta ctc aga gca gcc tgg aat gaa tta ctt ata gca	816
Asp Gln Val Thr Leu Leu Arg Ala Ala Trp Asn Glu Leu Leu Ile Ala	
260 265 270	
tct ata gcc tgg aga agt att gag tat cta gaa tcc gat gca gaa aca	864
Ser Ile Ala Trp Arg Ser Ile Glu Tyr Leu Glu Ser Asp Ala Glu Thr	
275 280 285	
agt acg tcc agt atg tct agt gat act tca aca agg aga cgc gct cca	912
Ser Thr Ser Ser Met Ser Ser Asp Thr Ser Thr Arg Arg Arg Ala Pro	
290 295 300	
cca gga ccg cct gaa tta atg tgt ttc ttt cct ggt atg acg tta cat	960
Pro Gly Pro Pro Glu Leu Met Cys Phe Phe Pro Gly Met Thr Leu His	
305 310 315 320	
cgg aat agt gca atc cag gct ggc gtc gga cct att ttc gat cgg gta	1008
Arg Asn Ser Ala Ile Gln Ala Gly Val Gly Pro Ile Phe Asp Arg Val	
325 330 335	
ctg tca gaa tta agt gtc aaa atg aga aga atg gat ttg gac aga gca	1056
Leu Ser Glu Leu Ser Val Lys Met Arg Arg Met Asp Leu Asp Arg Ala	
340 345 350	
gaa tta ggc tgt ttg aag gct ata ata ctg ttt aat cct gat att cga	1104
Glu Leu Gly Cys Leu Lys Ala Ile Ile Leu Phe Asn Pro Asp Ile Arg	
355 360 365	
gga ctg aaa tgt aga cag gaa gtg gat gct tta cga gaa aag gtt tac	1152
Gly Leu Lys Cys Arg Gln Glu Val Asp Ala Leu Arg Glu Lys Val Tyr	
370 375 380	
gcg tgc ctg gac gag cat tgc agg acg cag cat cca gcg gaa gag ggt	1200
Ala Cys Leu Asp Glu His Cys Arg Thr Gln His Pro Ala Glu Glu Gly	
385 390 395 400	

FC-4-1.ST25.txt

cgt ttc gca gcc ctg ctg ctt cgc ctg cca gct ctg agg tca atc tct 1248  
 Arg Phe Ala Ala Leu Leu Arg Leu Pro Ala Leu Arg Ser Ile Ser  
                   405                  410                  415

ttg aaa tgt ctc gat cac ctg ttt ttc ttc aga ttg att ggc gat acg 1296  
 Leu Lys Cys Leu Asp His Leu Phe Phe Phe Arg Leu Ile Gly Asp Thr  
                   420                  425                  430

ccg ctt gag agt ttt ctt gtg gat tta ctc gag gcc gga ccg atc ggt 1344  
 Pro Leu Glu Ser Phe Leu Val Asp Leu Leu Glu Ala Gly Pro Ile Gly  
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 <212> PRT  
 <213> Ctenocephalides felis

<400> 30

Met Glu Ser Ala Asp Arg Gly Leu Ala Leu Asp Gln Gly Leu Ser Met  
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Ser Ser Met Gly Pro Leu Ser Pro Pro Asp Met Lys Pro Asp Pro Ala  
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Leu Leu Asn Gly Gly Phe Ser Pro Gly Ser Gly Gly Ala Val Val Gly  
                   35                  40                  45

Ser Pro Ala Ser Pro Pro Phe Gly Gln Asn His Thr Ile Val Ser Gly  
                   50                  55                  60

Asn Thr Ala Thr Gly Ala Gln Thr Lys Ser Pro Tyr Pro Pro Asn His  
 65                  70                  75                  80

Pro Leu Ser Gly Ser Lys His Leu Cys Ser Ile Cys Gly Asp Arg Ala  
                   85                  90                  95

Ser Gly Lys His Tyr Gly Val Tyr Ser Cys Glu Gly Cys Lys Gly Phe  
                   100                  105                  110

Phe Lys Arg Thr Val Arg Lys Asp Leu Thr Tyr Ala Cys Arg Glu Asp  
                   115                  120                  125

Arg Asn Cys Leu Ile Asp Lys Arg Gln Arg Asn Arg Cys Gln Phe Cys  
                   130                  135                  140

Arg Tyr Gln Lys Cys Leu Ala Cys Gly Met Lys Arg Glu Ala Val Gln  
 145                  150                  155                  160

Glu Glu Arg Gln Arg Gly Ala Lys Asn Asn Glu Glu Ser Asn Pro Thr  
                   165                  170                  175

Ser Ser Val Arg Asp Leu Thr Val Glu Arg Ile Leu Glu Ala Glu Gln  
                   180                  185                  190

Arg Ser Glu Thr Arg Asn Val Ala Thr Asp Pro Glu Leu Ser Ile Gln  
                   195                  200                  205

Tyr Leu Arg Val Gly Pro Ser Ser Met Val Pro Pro Arg Tyr Lys Gly  
                   210                  215                  220

Pro Val Ser Ser Leu Cys Gln Gln Ala Asn Lys Gln Leu Tyr Gln Leu  
                   225                  230                  235                  240

Val Gln Tyr Ala Arg Cys Met Pro His Phe Ser Ala Leu Gln Leu Glu  
                   245                  250                  255

Asp Gln Val Thr Leu Leu Arg Ala Ala Trp Asn Glu Leu Leu Ile Ala  
                   260                  265                  270

Ser Ile Ala Trp Arg Ser Ile Glu Tyr Leu Glu Ser Asp Ala Glu Thr  
                   275                  280                  285

Ser Thr Ser Ser Met Ser Ser Asp Thr Ser Thr Arg Arg Arg Ala Pro  
                   290                  295                  300

Pro Gly Pro Pro Glu Leu Met Cys Phe Phe Pro Gly Met Thr Leu His  
                   305                  310                  315                  320

Arg Asn Ser Ala Ile Gln Ala Gly Val Gly Pro Ile Phe Asp Arg Val  
                   325                  330                  335

Leu Ser Glu Leu Ser Val Lys Met Arg Arg Met Asp Leu Asp Arg Ala  
                   340                  345                  350

Glu Leu Gly Cys Leu Lys Ala Ile Ile Leu Phe Asn Pro Asp Ile Arg  
                   355                  360                  365

Gly Leu Lys Cys Arg Gln Glu Val Asp Ala Leu Arg Glu Lys Val Tyr  
                   370                  375                  380

Ala Cys Leu Asp Glu His Cys Arg Thr Gln His Pro Ala Glu Glu Gly

385

390

395

400

Arg Phe Ala Ala Leu Leu Leu Arg Leu Pro Ala Leu Arg Ser Ile Ser  
 405 410 415

Leu Lys Cys Leu Asp His Leu Phe Phe Phe Arg Leu Ile Gly Asp Thr  
 420 425 430

Pro Leu Glu Ser Phe Leu Val Asp Leu Leu Glu Ala Gly Pro Ile Gly  
 435 440 445

&lt;210&gt; 31

&lt;211&gt; 1344

&lt;212&gt; DNA

&lt;213&gt; Ctenocephalides felis

&lt;400&gt; 31

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gcgaagcagc agggctgcga aacgaccctc ttccgctgga tgctgcgtcc tgcaatgctc      180
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tcgaatatca ggattaaaca gtattatagc cttcaaacag cctaattctg ctctgtccaa      300
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aggcggtcct ggtggagcgc gtctccttgt tgaagtatca ctagacatac tggacgtact      480
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cggcatgcac cttgcgtatt gtactaactg atataactgt ttatttgctt gctgacacag      660
actggataca gggcccttgt atctaggagg caccatggat gaaggtccta ctcgcaaata      720
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atcctctcga caggcatacg tcagatcttt tcgtaccgtc cgtttgaaaa atcccttaca     1020
accttcgcaa ctgtaaacac cataatgctt cccggaagcc ctatctccgc atatggagca     1080
cagatgtttt gaccgcgtca aaggatgatt tggagggtat ggtgatttcg tttgggcgcc     1140

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FC-4-1.ST25.txt

cgtggccgtg tttcctgata ctattgtgtg attttgacca aaaggcggac tagcgggact 1200  
gccgacaact ggcgccccac tgccggggcga aaagccgccg ttcagtagcg caggatccgg 1260  
tttcatatcc ggcggtgaga ggcgtcccat cgagctcatt gacagccctt ggtcgagggc 1320  
caagcctctg tctgcacttt ccat 1344

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<213> Ctenocephalides felis

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tgataagagt tgtgctttca taaaaaggaa ttgtttatta gattttgaat gacagtgtccc 180  
catgtggggag atgacatact gaacgtatta gtttatatgt tgcttataat tgagtatagg 240  
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gagtgaagttt atattagaaa tgaaggagac gcataaatgg taacttaatt aagcattaca 420  
atcaactggg aataaataaa tatatcttct aaa atg atg aaa gag aag cct 474  
Met Met Lys Lys Glu Lys Pro  
1 5  
atg atg tct gtg acg gct ttg att caa gga gcc gct cag aat caa ata 522  
Met Met Ser Val Thr Ala Leu Ile Gln Gly Ala Ala Gln Asn Gln Ile  
10 15 20  
tgg gga cga gga tta tct ggc ctt aca ggc ttg gcc ctc gac caa ggg 570  
Trp Gly Arg Gly Leu Ser Gly Leu Thr Gly Leu Ala Leu Asp Gln Gly  
25 30 35  
ctg tca atg agc tcg atg gga ccg ctc tca ctg ccg gat atg aaa ccg 618  
Leu Ser Met Ser Ser Met Gly Pro Leu Ser Leu Pro Asp Met Lys Pro  
40 45 50 55  
gat cct gcg cta ctg aac ggc ggc ttt tcg ccc ggc agt ggc ggc gca 666  
Asp Pro Ala Leu Leu Asn Gly Gly Phe Ser Pro Gly Ser Gly Gly Ala  
60 65 70  
gtt gtc ggc agt ccc gct agt ccg cct ttt ggt caa aat cac aca ata 714  
Val Val Gly Ser Pro Ala Ser Pro Pro Phe Gly Gln Asn His Thr Ile  
75 80 85

## FC-4-1.ST25.txt

gta tca gga aac acg gcc acg ggc gcc caa acg aaa tca cca tac cct	762
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cca aat cat cct ttg agc ggg tca aaa cat ctg tgc tcc ata tgc gga	810
Pro Asn His Pro Leu Ser Gly Ser Lys His Leu Cys Ser Ile Cys Gly	
105 110 115	
gat agg gct tcc ggg aag cat tat ggt gtt tac agt tgc gaa ggt tgt	858
Asp Arg Ala Ser Gly Lys His Tyr Gly Val Tyr Ser Cys Glu Gly Cys	
120 125 130 135	
aag gga ttt ttc aaa cgg acg gta cga aaa gat ctg acg tat gcc tgt	906
Lys Gly Phe Phe Lys Arg Thr Val Arg Lys Asp Leu Thr Tyr Ala Cys	
140 145 150	
cga gag gat aga aat tgt ttg atc gac aaa agg cag aga aat cga tgt	954
Arg Glu Asp Arg Asn Cys Leu Ile Asp Lys Arg Gln Arg Asn Arg Cys	
155 160 165	
cag ttc tgt cga tat cag aaa tgt ctc gcc tgt gga atg aaa cga gaa	1002
Gln Phe Cys Arg Tyr Gln Lys Cys Leu Ala Cys Gly Met Lys Arg Glu	
170 175 180	
gcc gtg cag gaa gaa cga caa cga gga gca aag aat aat gaa gaa agc	1050
Ala Val Gln Glu Glu Arg Gln Arg Gly Ala Lys Asn Asn Glu Glu Ser	
185 190 195	
aac ccg aca agt tct gtt cgt gat tta acg gta gaa aga att tta gaa	1098
Asn Pro Thr Ser Ser Val Arg Asp Leu Thr Val Glu Arg Ile Leu Glu	
200 205 210 215	
gca gaa caa agg agt gaa act cga aat gtt gcg acg gac ccg gaa ttg	1146
Ala Glu Gln Arg Ser Glu Thr Arg Asn Val Ala Thr Asp Pro Glu Leu	
220 225 230	
tcg ata caa tat ttg cga gta gga cct tca tcc atg gtg cct cct aga	1194
Ser Ile Gln Tyr Leu Arg Val Gly Pro Ser Ser Met Val Pro Pro Arg	
235 240 245	
tac aag ggc cct gta tcc agt ctg tgt cag caa gca aat aaa cag tta	1242
Tyr Lys Gly Pro Val Ser Ser Leu Cys Gln Gln Ala Asn Lys Gln Leu	
250 255 260	
tat cag tta gta caa tac gca agg tgc atg ccg cat ttt agt gct tta	1290
Tyr Gln Leu Val Gln Tyr Ala Arg Cys Met Pro His Phe Ser Ala Leu	
265 270 275	
caa tta gag gat caa gta acg tta ctc aga gca gcc tgg aat gaa tta	1338
Gln Leu Glu Asp Gln Val Thr Leu Leu Arg Ala Ala Trp Asn Glu Leu	
280 285 290 295	
ctt ata gca tct ata gcc tgg aga agt att gag tat cta gaa tcc gat	1386
Leu Ile Ala Ser Ile Ala Trp Arg Ser Ile Glu Tyr Leu Glu Ser Asp	
300 305 310	
gca gaa aca agt acg tcc agt atg tct agt gat act tca aca agg aga	1434
Ala Glu Thr Ser Thr Ser Ser Met Ser Ser Asp Thr Ser Thr Arg Arg	
315 320 325	

FC-4-1.ST25.txt

cgc gct cca cca gga ccg cct gaa tta atg tgt ttc ttt cct ggt atg Arg Ala Pro Pro Gly Pro Pro Glu Leu Met Cys Phe Phe Pro Gly Met 330 335 340	1482
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gat cgg gta ctg tca gaa tta agt gtc aaa atg aga aga atg gat ttg Asp Arg Val Leu Ser Glu Leu Ser Val Lys Met Arg Arg Met Asp Leu 360 365 370 375	1578
gac aga gca gaa tta ggc tgt ttg aag gct ata ata ctg ttt aat cct Asp Arg Ala Glu Leu Gly Cys Leu Lys Ala Ile Ile Leu Phe Asn Pro 380 385 390	1626
gat att cga gga ctg aaa tgt aga cag gaa gtg gat gct tta cga gaa Asp Ile Arg Gly Leu Lys Cys Arg Gln Glu Val Asp Ala Leu Arg Glu 395 400 405	1674
aag gtt tac gcg tgc ctg gac gag cat tgc agg acg cag cat cca gcg Lys Val Tyr Ala Cys Leu Asp Glu His Cys Arg Thr Gln His Pro Ala 410 415 420	1722
gaa gag ggt cgt ttc gca gcc ctg ctg ctt cgc ctg cca gct ctg agg Glu Glu Gly Arg Phe Ala Ala Leu Leu Leu Arg Leu Pro Ala Leu Arg 425 430 435	1770
tca atc tct ttg aaa tgt ctc gat cac ctg ttt ttc ttc aga ttg att Ser Ile Ser Leu Lys Cys Leu Asp His Leu Phe Phe Phe Arg Leu Ile 440 445 450 455	1818
ggc gat acg ccg ctt gag agt ttt ctt gtg gat tta ctc gag gcc gga Gly Asp Thr Pro Leu Glu Ser Phe Leu Val Asp Leu Leu Glu Ala Gly 460 465 470	1866
ccg atc ggt tga gccgattcat ggataaaaga taagttttat gtattaagat Pro Ile Gly	1918
gagaataagt aaatattctg caaagttatt ttttctgcac gaatatttct acaagca	1975

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 <213> Ctenocephalides felis

<400> 33

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Gly Ala Ala Gln Asn Gln Ile Trp Gly Arg Gly Leu Ser Gly Leu Thr
20 25 30

FC-4-1.ST25.txt

Gly Leu Ala Leu Asp Gln Gly Leu Ser Met Ser Ser Met Gly Pro Leu  
35 40 45

Ser Leu Pro Asp Met Lys Pro Asp Pro Ala Leu Leu Asn Gly Gly Phe  
50 55 60

Ser Pro Gly Ser Gly Gly Ala Val Val Gly Ser Pro Ala Ser Pro Pro  
65 70 75 80

Phe Gly Gln Asn His Thr Ile Val Ser Gly Asn Thr Ala Thr Gly Ala  
85 90 95

Gln Thr Lys Ser Pro Tyr Pro Pro Asn His Pro Leu Ser Gly Ser Lys  
100 105 110

His Leu Cys Ser Ile Cys Gly Asp Arg Ala Ser Gly Lys His Tyr Gly  
115 120 125

Val Tyr Ser Cys Glu Gly Cys Lys Gly Phe Phe Lys Arg Thr Val Arg  
130 135 140

Lys Asp Leu Thr Tyr Ala Cys Arg Glu Asp Arg Asn Cys Leu Ile Asp  
145 150 155 160

Lys Arg Gln Arg Asn Arg Cys Gln Phe Cys Arg Tyr Gln Lys Cys Leu  
165 170 175

Ala Cys Gly Met Lys Arg Glu Ala Val Gln Glu Glu Arg Gln Arg Gly  
180 185 190

Ala Lys Asn Asn Glu Glu Ser Asn Pro Thr Ser Ser Val Arg Asp Leu  
195 200 205

Thr Val Glu Arg Ile Leu Glu Ala Glu Gln Arg Ser Glu Thr Arg Asn  
210 215 220

Val Ala Thr Asp Pro Glu Leu Ser Ile Gln Tyr Leu Arg Val Gly Pro  
225 230 235 240

Ser Ser Met Val Pro Pro Arg Tyr Lys Gly Pro Val Ser Ser Leu Cys  
245 250 255

Gln Gln Ala Asn Lys Gln Leu Tyr Gln Leu Val Gln Tyr Ala Arg Cys  
260 265 270

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Met Pro His Phe Ser Ala Leu Gln Leu Glu Asp Gln Val Thr Leu Leu  
275 280 285

Arg Ala Ala Trp Asn Glu Leu Leu Ile Ala Ser Ile Ala Trp Arg Ser  
290 295 300

Ile Glu Tyr Leu Glu Ser Asp Ala Glu Thr Ser Thr Ser Ser Met Ser  
305 310 315 320

Ser Asp Thr Ser Thr Arg Arg Arg Ala Pro Pro Gly Pro Pro Glu Leu  
325 330 335

Met Cys Phe Phe Pro Gly Met Thr Leu His Arg Asn Ser Ala Ile Gln  
340 345 350

Ala Gly Val Gly Pro Ile Phe Asp Arg Val Leu Ser Glu Leu Ser Val  
355 360 365

Lys Met Arg Arg Met Asp Leu Asp Arg Ala Glu Leu Gly Cys Leu Lys  
370 375 380

Ala Ile Ile Leu Phe Asn Pro Asp Ile Arg Gly Leu Lys Cys Arg Gln  
385 390 395 400

Glu Val Asp Ala Leu Arg Glu Lys Val Tyr Ala Cys Leu Asp Glu His  
405 410 415

Cys Arg Thr Gln His Pro Ala Glu Glu Gly Arg Phe Ala Ala Leu Leu  
420 425 430

Leu Arg Leu Pro Ala Leu Arg Ser Ile Ser Leu Lys Cys Leu Asp His  
435 440 445

Leu Phe Phe Phe Arg Leu Ile Gly Asp Thr Pro Leu Glu Ser Phe Leu  
450 455 460

Val Asp Leu Leu Glu Ala Gly Pro Ile Gly  
465 470

<210> 34  
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<212> DNA  
<213> Ctenocephalides felis

<400> 34

FC-4-1.ST25.txt

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gtaaatccac aagaaaactc tcaagcggcg tatcgccaat caatctgaag aaaaacaggt	180
gatcgagaca tttcaaagag attgacctca gagctggcag gcgaagcagc agggctgcga	240
aacgaccctc ttccgctgga tgctgcgtcc tgcaatgctc gtccaggcac gcgtaaacct	300
tttctcgtaa agcatccact tcctgtctac atttcagtcc tcgaatatca ggattaaaca	360
gtattatagc cttcaaacag cctaattctg ctctgtccaa atccattctt ctcatcttga	420
cacttaattc tgacagtacc cgatcgaaaa taggtccgac gccagcctgg attgcactat	480
tccgatgtaa cgtcatacca ggaaagaaac acattaattc aggcggctct ggtggagcgc	540
gtctccttgt tgaagtatca ctagacatac tggacgtact tgtttctgca tcggattcta	600
gataactaat acttctccag gctatagatg ctataagtaa ttcattccag gctgctctga	660
gtaacgttac ttgatcctct aattgtaaag cactaaaatg cggcatgcac cttgcgtatt	720
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ccgtcgcaac atttcgagtt tcactccttt gttctgcttc taaaattctt tctaccgtta	900
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gcggtcccat cgagctcatt gacagccctt ggtcgagggc caagcctgta aggccagata	1440
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taggcttctc ttttttcatc attttagaag atatatttat ttattcccag ttgattgtaa	1560
tgcttaatta agttaccatt tatgcgtctc cttcatttct aatataaact cactcactga	1620
tatgtgtact agtcatgttg aatttcttaa tgacactttt tttatatttg acccttactt	1680
taagtttttg aggtaacatt tggagttacc aaaaaattga aattaacagt ttattcctat	1740
actcaattat aagcaacata taaactaata cgttcagtat gtcattctcc acatggggca	1800

FC-4-1.ST25.txt

ctgtcattca aaatctaata aacaattcct ttttatgaaa gcacaactct tatcacacag 1860  
 cacaaaaatt atctcgagac taaaactaaa cacaaaatat ttaaaatata gttcatcttc 1920  
 gaacacgtca aaacaaaccg agtcgcgcgc ataccatcac ttcaatcact tgact 1975

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 <212> DNA  
 <213> Ctenocephalides felis

<220>  
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<400> 35  
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 gga gcc gct cag aat caa ata tgg gga cga gga tta tct ggc ctt aca 96  
 Gly Ala Ala Gln Asn Gln Ile Trp Gly Arg Gly Leu Ser Gly Leu Thr  
 20 25 30  
 ggc ttg gcc ctc gac caa ggg ctg tca atg agc tcg atg gga ccg ctc 144  
 Gly Leu Ala Leu Asp Gln Gly Leu Ser Met Ser Ser Met Gly Pro Leu  
 35 40 45  
 tca ctg ccg gat atg aaa ccg gat cct gcg cta ctg aac ggc ggc ttt 192  
 Ser Leu Pro Asp Met Lys Pro Asp Pro Ala Leu Leu Asn Gly Gly Phe  
 50 55 60  
 tcg ccc ggc agt ggc ggc gca gtt gtc ggc agt ccc gct agt ccg cct 240  
 Ser Pro Gly Ser Gly Gly Ala Val Val Gly Ser Pro Ala Ser Pro Pro  
 65 70 75 80  
 ttt ggt caa aat cac aca ata gta tca gga aac acg gcc acg ggc gcc 288  
 Phe Gly Gln Asn His Thr Ile Val Ser Gly Asn Thr Ala Thr Gly Ala  
 85 90 95  
 caa acg aaa tca cca tac cct cca aat cat cct ttg agc ggc tca aaa 336  
 Gln Thr Lys Ser Pro Tyr Pro Pro Asn His Pro Leu Ser Gly Ser Lys  
 100 105 110  
 cat ctg tgc tcc ata tgc gga gat agg gct tcc ggc aag cat tat ggt 384  
 His Leu Cys Ser Ile Cys Gly Asp Arg Ala Ser Gly Lys His Tyr Gly  
 115 120 125  
 gtt tac agt tgc gaa ggt tgt aag gga ttt ttc aaa cgg acg gta cga 432  
 Val Tyr Ser Cys Glu Gly Cys Lys Gly Phe Phe Lys Arg Thr Val Arg  
 130 135 140  
 aaa gat ctg acg tat gcc tgt cga gag gat aga aat tgt ttg atc gac 480  
 Lys Asp Leu Thr Tyr Ala Cys Arg Glu Asp Arg Asn Cys Leu Ile Asp  
 145 150 155 160

## FC-4-1.ST25.txt

aaa agg cag aga aat cga tgt cag ttc tgt cga tat cag aaa tgt ctc	528
Lys Arg Gln Arg Asn Arg Cys Gln Phe Cys Arg Tyr Gln Lys Cys Leu	
165 170 175	
gcc tgt gga atg aaa cga gaa gcc gtg cag gaa gaa cga caa cga gga	576
Ala Cys Gly Met Lys Arg Glu Ala Val Gln Glu Glu Arg Gln Arg Gly	
180 185 190	
gca aag aat aat gaa gaa agc aac ccg aca agt tct gtt cgt gat tta	624
Ala Lys Asn Asn Glu Glu Ser Asn Pro Thr Ser Ser Val Arg Asp Leu	
195 200 205	
acg gta gaa aga att tta gaa gca gaa caa agg agt gaa act cga aat	672
Thr Val Glu Arg Ile Leu Glu Ala Glu Gln Arg Ser Glu Thr Arg Asn	
210 215 220	
gtt gcg acg gac ccg gaa ttg tcg ata caa tat ttg cga gta gga cct	720
Val Ala Thr Asp Pro Glu Leu Ser Ile Gln Tyr Leu Arg Val Gly Pro	
225 230 235 240	
tca tcc atg gtg cct cct aga tac aag ggc cct gta tcc agt ctg tgt	768
Ser Ser Met Val Pro Pro Arg Tyr Lys Gly Pro Val Ser Ser Leu Cys	
245 250 255	
cag caa gca aat aaa cag tta tat cag tta gta caa tac gca agg tgc	816
Gln Gln Ala Asn Lys Gln Leu Tyr Gln Leu Val Gln Tyr Ala Arg Cys	
260 265 270	
atg ccg cat ttt agt gct tta caa tta gag gat caa gta acg tta ctc	864
Met Pro His Phe Ser Ala Leu Gln Leu Glu Asp Gln Val Thr Leu Leu	
275 280 285	
aga gca gcc tgg aat gaa tta ctt ata gca tct ata gcc tgg aga agt	912
Arg Ala Ala Trp Asn Glu Leu Leu Ile Ala Ser Ile Ala Trp Arg Ser	
290 295 300	
att gag tat cta gaa tcc gat gca gaa aca agt acg tcc agt atg tct	960
Ile Glu Tyr Leu Glu Ser Asp Ala Glu Thr Ser Thr Ser Ser Met Ser	
305 310 315 320	
agt gat act tca aca agg aga cgc gct cca cca gga ccg cct gaa tta	1008
Ser Asp Thr Ser Thr Arg Arg Arg Ala Pro Pro Gly Pro Pro Glu Leu	
325 330 335	
atg tgt ttc ttt cct ggt atg acg tta cat cgg aat agt gca atc cag	1056
Met Cys Phe Phe Pro Gly Met Thr Leu His Arg Asn Ser Ala Ile Gln	
340 345 350	
gct ggc gtc gga cct att ttc gat cgg gta ctg tca gaa tta agt gtc	1104
Ala Gly Val Gly Pro Ile Phe Asp Arg Val Leu Ser Glu Leu Ser Val	
355 360 365	
aaa atg aga aga atg gat ttg gac aga gca gaa tta ggc tgt ttg aag	1152
Lys Met Arg Arg Met Asp Leu Asp Arg Ala Glu Leu Gly Cys Leu Lys	
370 375 380	
gct ata ata ctg ttt aat cct gat att cga gga ctg aaa tgt aga cag	1200
Ala Ile Ile Leu Phe Asn Pro Asp Ile Arg Gly Leu Lys Cys Arg Gln	



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385	390	395	400	
gaa gtg gat gct tta cga gaa aag gtt tac gcg tgc ctg gac gag cat				1248
Glu Val Asp Ala Leu Arg Glu Lys Val Tyr Ala Cys Leu Asp Glu His				
	405	410	415	
tgc agg acg cag cat cca gcg gaa gag ggt cgt ttc gca gcc ctg ctg				1296
Cys Arg Thr Gln His Pro Ala Glu Glu Gly Arg Phe Ala Ala Leu Leu				
	420	425	430	
ctt cgc ctg cca gct ctg agg tca atc tct ttg aaa tgt ctc gat cac				1344
Leu Arg Leu Pro Ala Leu Arg Ser Ile Ser Leu Lys Cys Leu Asp His				
	435	440	445	
ctg ttt ttc ttc aga ttg att ggc gat acg ccg ctt gag agt ttt ctt				1392
Leu Phe Phe Phe Arg Leu Ile Gly Asp Thr Pro Leu Glu Ser Phe Leu				
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gtg gat tta ctc gag gcc gga ccg atc ggt				1422
Val Asp Leu Leu Glu Ala Gly Pro Ile Gly				
	465	470		

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 <211> 474  
 <212> PRT  
 <213> Ctenocephalides felis

<400> 36

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Gly Leu Ala Leu Asp Gln Gly Leu Ser Met Ser Ser Met Gly Pro Leu	
35 40 45	
Ser Leu Pro Asp Met Lys Pro Asp Pro Ala Leu Leu Asn Gly Gly Phe	
50 55 60	
Ser Pro Gly Ser Gly Gly Ala Val Val Gly Ser Pro Ala Ser Pro Pro	
65 70 75 80	
Phe Gly Gln Asn His Thr Ile Val Ser Gly Asn Thr Ala Thr Gly Ala	
85 90 95	
Gln Thr Lys Ser Pro Tyr Pro Pro Asn His Pro Leu Ser Gly Ser Lys	
100 105 110	
His Leu Cys Ser Ile Cys Gly Asp Arg Ala Ser Gly Lys His Tyr Gly	

115		120		125
Val Tyr Ser Cys Glu Gly Cys Lys Gly Phe Phe Lys Arg Thr Val Arg				
130		135		140
Lys Asp Leu Thr Tyr Ala Cys Arg Glu Asp Arg Asn Cys Leu Ile Asp				
145		150		155
Lys Arg Gln Arg Asn Arg Cys Gln Phe Cys Arg Tyr Gln Lys Cys Leu				
		165		170
Ala Cys Gly Met Lys Arg Glu Ala Val Gln Glu Glu Arg Gln Arg Gly				
		180		185
Ala Lys Asn Asn Glu Glu Ser Asn Pro Thr Ser Ser Val Arg Asp Leu				
		195		200
Thr Val Glu Arg Ile Leu Glu Ala Glu Gln Arg Ser Glu Thr Arg Asn				
		210		215
Val Ala Thr Asp Pro Glu Leu Ser Ile Gln Tyr Leu Arg Val Gly Pro				
225		230		235
Ser Ser Met Val Pro Pro Arg Tyr Lys Gly Pro Val Ser Ser Leu Cys				
		245		250
Gln Gln Ala Asn Lys Gln Leu Tyr Gln Leu Val Gln Tyr Ala Arg Cys				
		260		265
Met Pro His Phe Ser Ala Leu Gln Leu Glu Asp Gln Val Thr Leu Leu				
		275		280
Arg Ala Ala Trp Asn Glu Leu Leu Ile Ala Ser Ile Ala Trp Arg Ser				
		290		295
Ile Glu Tyr Leu Glu Ser Asp Ala Glu Thr Ser Thr Ser Ser Met Ser				
305		310		315
Ser Asp Thr Ser Thr Arg Arg Arg Ala Pro Pro Gly Pro Pro Glu Leu				
		325		330
Met Cys Phe Phe Pro Gly Met Thr Leu His Arg Asn Ser Ala Ile Gln				
		340		345
				350

FC-4-1.ST25.txt

Ala Gly Val Gly Pro Ile Phe Asp Arg Val Leu Ser Glu Leu Ser Val  
355 360 365

Lys Met Arg Arg Met Asp Leu Asp Arg Ala Glu Leu Gly Cys Leu Lys  
370 375 380

Ala Ile Ile Leu Phe Asn Pro Asp Ile Arg Gly Leu Lys Cys Arg Gln  
385 390 395 400

Glu Val Asp Ala Leu Arg Glu Lys Val Tyr Ala Cys Leu Asp Glu His  
405 410 415

Cys Arg Thr Gln His Pro Ala Glu Glu Gly Arg Phe Ala Ala Leu Leu  
420 425 430

Leu Arg Leu Pro Ala Leu Arg Ser Ile Ser Leu Lys Cys Leu Asp His  
435 440 445

Leu Phe Phe Phe Arg Leu Ile Gly Asp Thr Pro Leu Glu Ser Phe Leu  
450 455 460

Val Asp Leu Leu Glu Ala Gly Pro Ile Gly  
465 470

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<212> DNA  
<213> Ctenocephalides felis

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gcgaagcagc agggctgcga aacgaccctc ttccgctgga tgctgcgtcc tgcaatgctc 180  
gtccaggcac gcgtaaacct tttctcgtaa agcatccact tcctgtctac atttcagtcc 240  
tcgaatatca ggattaaaca gtattatagc cttcaaacag cctaattctg ctctgtccaa 300  
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gccagcctgg attgcactat tccgatgtaa cgtcatacca ggaaagaaac acattaattc 420  
aggcggctct ggtggagcgc gtctccttgt tgaagtatca ctagacatac tggacgtact 480  
tgtttctgca tcggattcta gatactcaat acttctccag gctatagatg ctataagtaa 540  
ttcattccag gctgctctga gtaacgttac ttgatcctct aattgtaaag cactaaaatg 600  
cggcatgcac cttgcgtatt gtactaactg atataactgt ttatttgctt gctgacacag 660

FC-4-1.ST25.txt

actggataca gggcccttgt atctaggagg caccatggat gaaggctcta ctcgcaaata	720
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taaaattctt tctaccgtta aatcacgaac agaacttgctc gggtttgcttt cttcattatt	840
ctttgctcct cgttgtcggt cttcctgcac ggcttctcgt ttcattccac aggcgagaca	900
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accttcgcaa ctgtaaacac cataatgctt cccggaagcc ctatctccgc atatggagca	1080
cagatgtttt gaccgcgtca aaggatgatt tggagggtat ggtgatttcg tttgggcgcc	1140
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caagcctgta aggccagata atcctcgtcc ccatatttga ttctgagcgg ctcttgaat	1380
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 <211> 612  
 <212> DNA  
 <213> Ctenocephalides felis

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tcaagtgaag taatgatgct gcgaatggct cggcggtagc atgcagtgtc ggattcaatc	240
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gagtatgcac taataacagc aattgtgatt ttttcagatc gacctggatt ggaacaagca	420
gatcttgtgg aacaaattca aagttattac atcaaaacat taaagtgcta cattttgaat	480
cgacatagtg gtgaccctaa gtgtggaata ttgtttgcc aacttctttc tattcttact	540
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<210> 39  
 <211> 612

&lt;212&gt; DNA

&lt;213&gt; Ctenocephalides felis

&lt;400&gt; 39

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accactatgt cgattcaaaa tgtagcactt taatgttttg atgtaataac tttgaatttg      180
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attcgcgaat aagattgaat cgcacactgc atcgtaccgc cgagccattc gcagcatcat      420
tacttcactt gaacatgcct ttaataatgt tatttgatct tcttgtggta ttttggtaaa      480
agctggtaaa ccctttgcaa attccactat aagctgcaca gtaagtatgg taatttcagt      540
tatatgccga aattcaagag cttcatcttc agctgggtga cttatcatta tccttcgtag      600
gtcttcctca ga                                          612

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&lt;210&gt; 40

&lt;211&gt; 776

&lt;212&gt; DNA

&lt;213&gt; Ctenocephalides felis

&lt;400&gt; 40

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cctgtatcca gtctgtgtca gcaagcaaatt aaacagttat atcagttagt acaatacgca      180
aggtgcatgc cgcattttag tgcttttaca ttagaggatc aagtaacgtt actcagagca      240
gcctggaatg aattacttat agcatctata gcctggagaa gtattgagta tctagaatcc      300
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cctgatattc gaggactgaa atgtagacag gaagtggatg ctttacgaga aaaggtttac      600
gcgtgcctgg acgagcattg caggacgcag catccagcgg aagagggtcg tttcgcagcc      660
ctgctgcttc gcctgccagc tctgaggtca atctctttga aatgtctcga tcacctgttt      720
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 gcgaaacgac cctcttccgc tggatgctgc gtctcgcaat gctcgtccag gcacgcgtaa 180  
 accttttctc gtaaagcatt cacttctctgt ctacatttca gtctctgaat atcaggatta 240  
 aacagtatta tagccttcaa acagccta at tctgctctgt ccaaattccat tcttctcatt 300  
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 ctgagtaacg ttacttgatc ctctaattgt aaagcactaa aatgcggcat gcaccttgcg 600  
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 cgacgatgac gataaggatc cctctgttcg agatttaacg gtagaaagaa ttttagaagc 180  
 ggaacaaagg agtgaaactc gaaatgttgc gacggaccgc gaattgtcga tacaatattt 240  
 gcgagtagga cttcatcca tgggtgcctcc tagatacaag ggccctgtat ccagtctgtg 300  
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 tagtgcttta caattagagg atcaagtaac gttactcaga gcagcctgga atgaattact 420  
 tatagcatct atagcctgga gaagtattga gtatctagaa tccgatgcag aaacaagtac 480  
 gtccagtatg tctagtgata cttcaacaag gagacgcgct ccaccaggac cgctgaatt 540  
 aatgtgtttc cttcttggtg tgacgttaca tcggaatagt gcaatccagg ctggcgtcgg 600

FC-4-1.ST25.txt

acctaatttc gatcgggtac tgtcagaatt aagtgtcaaa atgagaagaa tggatttggg 660  
cagagcagaa ttaggctggt tgaaggctat aatactgttt aatcctgata ttcgaggact 720  
gaaatgtaga caggaagtgg atgctttacg agaaaagggt tacgcgtgcc tggacgagca 780  
ttgcaggacg cagcatccag cggaagaggg tcgtttcgca gccctgctgc ttcgcctgcc 840  
agctctgagg tcaatctctt tgaaatgtct cgatcacctg tttttcttca gattgattgg 900  
cgatacgccg cttgagagtt ttcttgtgga tttactcgag gcc 943

<210> 43  
<211> 943  
<212> DNA  
<213> Ctenocephalides felis

<400> 43  
ggcctcgagt aaatccacaa gaaaactctc aagcggcgta tcgccaatca atctgaagaa 60  
aaacaggtga tcgagacatt tcaaagagat tgacctcaga gctggcaggc gaagcagcag 120  
ggctgcgaaa cgaccctctt ccgctggatg ctgcgtcctg caatgctcgt ccaggcacgc 180  
gtaaaccttt tctcgtaaag catccacttc ctgtctacat ttcagtcctc gaatatcagg 240  
attaaacagt attatagcct tcaaacagcc taattctgct ctgtccaaat ccattcttct 300  
cattttgaca cttaattctg acagtaccgc atcgaaatta ggtccgacgc cagcctggat 360  
tgcactattc cgatgtaacg tcataccagg aaggaaacac attaattcag gcggtcctgg 420  
tggagcgcgt ctcttgttg aagtatcact agacatactg gacgtacttg tttctgcatc 480  
ggattctaga tactcaatac ttctccaggc tatagatgct ataagtaatt cattccaggc 540  
tgctctgagt aacgttactt gatcctctaa ttgtaaagca ctaaaatgcg gcatgcacct 600  
tgcgtattgt actaactgat ataactgttt atttgcttgc tgacacagac tggatacagg 660  
gcccttgat ctaggaggca ccatggatga aggtcctact cgcaaataatt gtatcgacaa 720  
ttccgggtcc gtcgcaacat ttcgagtttc actcctttgt tccgcttcta aaattctttc 780  
taccgttaaa tctcgaacag agggatcctt atcgatcatc tcgtacagat cccgacccat 840  
ttgctgtcca ccagtcatgc tagccatacc atgatgatga tgatgatgag aaccccccat 900  
ggtttattcc tccttattta atcgatacat taatatatac etc 943

<210> 44  
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<220>

<223> Synthetic Primer  
 <400> 44  
 tgygaaatgg ayatgtayat g 21

<210> 45  
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 <212> DNA  
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<220>  
 <223> Synthetic Primer

<220>  
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 <222> (15)..(15)  
 <223> n = unknown

<400> 45  
 ccyyttwgcra attcnacdat 20

<210> 46  
 <211> 18  
 <212> DNA  
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<220>  
 <223> Synthetic Primer

<400> 46  
 gggtcccgaa aaccaatg 18

<210> 47  
 <211> 19  
 <212> DNA  
 <213> Artificial sequence

<220>  
 <223> Synthetic Primer

<400> 47  
 gccgaaattc aagagcttc 19

<210> 48  
 <211> 18  
 <212> DNA  
 <213> Artificial sequence

<220>  
 <223> Synthetic Primer

<400> 48  
 gtcaggaatg taggctca 18



<210> 49  
 <211> 20  
 <212> DNA  
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<220>  
 <223> Synthetic Primer

<400> 49  
 aattaaccct cactaaaggg

20

<210> 50  
 <211> 20  
 <212> DNA  
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<220>  
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<400> 50  
 ggwaaacayt atggwgtwta

20

<210> 51  
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<220>  
 <223> Synthetic Primer

<220>  
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 <223> n = unknown

<400> 51  
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18

<210> 52  
 <211> 20  
 <212> DNA  
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<220>  
 <223> Synthetic Primer

<400> 52  
 ttctcgtttc attccacagg

20

<210> 53  
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 <212> DNA  
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<220>  
 <223> Synthetic Primer  
  
 <400> 53  
 aaaggggaaca aaagctggag ctccaccgc 29  
  
 <210> 54  
 <211> 28  
 <212> DNA  
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 <223> Synthetic Primer  
  
 <400> 54  
 ttaaaatatc actggttcgt atcctccc 28  
  
 <210> 55  
 <211> 26  
 <212> DNA  
 <213> Artificial sequence  
  
 <220>  
 <223> Synthetic Primer  
  
 <400> 55  
 ggcggccgct ctagaactag tggatc 26  
  
 <210> 56  
 <211> 23  
 <212> DNA  
 <213> Artificial sequence  
  
 <220>  
 <223> Synthetic Primer  
  
 <400> 56  
 agacaatcaa tatcccaagt gcg 23  
  
 <210> 57  
 <211> 27  
 <212> DNA  
 <213> Artificial sequence  
  
 <220>  
 <223> Synthetic Primer  
  
 <400> 57  
 ctgcataaaa tgcctaaagt cgcggac 27  
  
 <210> 58  
 <211> 30  
 <212> DNA

<213> Artificial sequence

<220>

<223> Synthetic Primer

<400> 58

gcgggatccc aagatggata tgaacaacct

30

<210> 59

<211> 36

<212> DNA

<213> Artificial sequence

<220>

<223> Synthetic Primer

<400> 59

gcggaattct caatcccaaa tttcttctaa aaatct

36

<210> 60

<211> 31

<212> DNA

<213> Artificial sequence

<220>

<223> Synthetic Primer

<400> 60

gcgggatccc tctgttcgag atttaacggt a

31

<210> 61

<211> 27

<212> DNA

<213> Artificial sequence

<220>

<223> Synthetic Primer

<400> 61

gcgaagcttt caaccgatgg gtccgcc

27

<210> 62

<211> 36

<212> DNA

<213> Artificial sequence

<220>

<223> Synthetic Primer

<400> 62

gcgccccggg gattaacttt attattaaaa attaaa

36

<210> 63

<211> 33

<212> DNA  
 <213> Artificial sequence

<220>  
 <223> Synthetic Primer

<400> 63  
 gcgcgcggcc gcaagctttc aaccgatggg tcc

33

<210> 64  
 <211> 66  
 <212> PRT  
 <213> Ctenocephalides felis

<400> 64

Cys Leu Val Cys Gly Asp Arg Ala Ser Gly Tyr His Tyr Asn Ala Leu  
 1 5 10 15

Thr Cys Glu Gly Cys Lys Gly Phe Phe Arg Arg Ser Val Thr Lys Asn  
 20 25 30

Ala Val Tyr Val Cys Lys Phe Gly His Thr Cys Glu Met Asp Met Tyr  
 35 40 45

Met Arg Arg Lys Cys Gln Glu Cys Arg Leu Lys Lys Cys Leu Ala Val  
 50 55 60

Gly Met  
 65

<210> 65  
 <211> 219  
 <212> PRT  
 <213> Ctenocephalides felis

<400> 65

Gln Asp Gly Tyr Glu Gln Pro Ser Glu Glu Asp Leu Arg Arg Ile Met  
 1 5 10 15

Ile Ser Thr Pro Ala Glu Asp Glu Ala Leu Glu Phe Arg His Ile Thr  
 20 25 30

Glu Ile Thr Ile Leu Thr Val Gln Leu Ile Val Glu Phe Ala Lys Gly  
 35 40 45

Leu Pro Ala Phe Thr Lys Ile Pro Gln Glu Asp Gln Ile Thr Leu Leu  
 50 55 60

FC-4-1.ST25.txt

Lys Ala Cys Ser Ser Glu Val Met Met Leu Arg Met Ala Arg Arg Tyr  
65 70 75 80

Asp Ala Val Ser Asp Ser Ile Leu Phe Ala Asn Asn Arg Ser Tyr Thr  
85 90 95

Arg Asp Ser Tyr Lys Met Ala Gly Met Ala Asp Thr Ile Glu Asp Leu  
100 105 110

Leu His Phe Cys Arg Gln Met Tyr Thr Met Thr Val Asp Asn Val Glu  
115 120 125

Tyr Ala Leu Ile Thr Ala Ile Val Ile Phe Ser Asp Arg Pro Gly Leu  
130 135 140

Glu Gln Ala Asp Leu Val Glu Gln Ile Gln Ser Tyr Tyr Ile Lys Thr  
145 150 155 160

Leu Lys Cys Tyr Ile Leu Asn Arg His Ser Gly Asp Pro Lys Cys Gly  
165 170 175

Ile Leu Phe Ala Lys Leu Leu Ser Ile Leu Thr Glu Leu Arg Thr Leu  
180 185 190

Gly Asn Gln Asn Ser Glu Met Cys Phe Ala Leu Lys Leu Lys Asn Arg  
195 200 205

Lys Leu Pro Arg Phe Leu Glu Glu Ile Trp Asp  
210 215

<210> 66  
<211> 66  
<212> PRT  
<213> Ctenocephalides felis

<400> 66

Cys Leu Val Cys Gly Asp Arg Ala Ser Gly Tyr His Tyr Asn Ala Leu  
1 5 10 15

Thr Cys Glu Gly Cys Lys Gly Phe Phe Arg Arg Ser Val Thr Lys Asn  
20 25 30

Ala Val Tyr Val Cys Lys Phe Gly His Thr Cys Glu Met Asp Met Tyr  
35 40 45

FC-4-1.ST25.txt

Met Arg Arg Lys Cys Gln Glu Cys Arg Leu Lys Lys Cys Leu Ala Val  
50 55 60

Gly Met  
65

<210> 67  
<211> 219  
<212> PRT  
<213> Ctenocephalides felis

<400> 67

Gln Asp Gly Tyr Glu Gln Pro Ser Glu Glu Asp Leu Arg Arg Ile Met  
1 5 10 15

Ile Ser Thr Pro Ala Glu Asp Glu Ala Leu Glu Phe Arg His Ile Thr  
20 25 30

Glu Ile Thr Ile Leu Thr Val Gln Leu Ile Val Glu Phe Ala Lys Gly  
35 40 45

Leu Pro Ala Phe Thr Lys Ile Pro Gln Glu Asp Gln Ile Thr Leu Leu  
50 55 60

Lys Ala Cys Ser Ser Glu Val Met Met Leu Arg Met Ala Arg Arg Tyr  
65 70 75 80

Asp Ala Val Ser Asp Ser Ile Leu Phe Ala Asn Asn Arg Ser Tyr Thr  
85 90 95

Arg Asp Ser Tyr Lys Met Ala Gly Met Ala Asp Thr Ile Glu Asp Leu  
100 105 110

Leu His Phe Cys Arg Gln Met Tyr Thr Met Thr Val Asp Asn Val Glu  
115 120 125

Tyr Ala Leu Ile Thr Ala Ile Val Ile Phe Ser Asp Arg Pro Gly Leu  
130 135 140

Glu Gln Ala Asp Leu Val Glu Gln Ile Gln Ser Tyr Tyr Ile Lys Thr  
145 150 155 160

Leu Lys Cys Tyr Ile Leu Asn Arg His Ser Gly Asp Pro Lys Cys Gly  
165 170 175

FC-4-1.ST25.txt

Ile Leu Phe Ala Lys Leu Leu Ser Ile Leu Thr Glu Leu Arg Thr Leu  
180 185 190

Gly Asn Gln Asn Ser Glu Met Cys Phe Ala Leu Lys Leu Lys Asn Arg  
195 200 205

Lys Leu Pro Arg Phe Leu Glu Glu Ile Trp Asp  
210 215

<210> 68  
<211> 66  
<212> PRT  
<213> Ctenocephalides felis

<400> 68

Cys Ser Ile Cys Gly Asp Arg Ala Ser Gly Lys His Tyr Gly Val Tyr  
1 5 10 15

Ser Cys Glu Gly Cys Lys Gly Phe Phe Lys Arg Thr Val Arg Lys Asp  
20 25 30

Leu Thr Tyr Ala Cys Arg Glu Asp Arg Asn Cys Leu Ile Asp Lys Arg  
35 40 45

Gln Arg Asn Arg Cys Gln Phe Cys Arg Tyr Gln Lys Cys Leu Ala Cys  
50 55 60

Gly Met  
65

<210> 69  
<211> 271  
<212> PRT  
<213> Ctenocephalides felis

<400> 69

Ser Val Arg Asp Leu Thr Val Glu Arg Ile Leu Glu Ala Glu Gln Arg  
1 5 10 15

Ser Glu Thr Arg Asn Val Ala Thr Asp Pro Glu Leu Ser Ile Gln Tyr  
20 25 30

Leu Arg Val Gly Pro Ser Ser Met Val Pro Pro Arg Tyr Lys Gly Pro  
35 40 45

FC-4-1.ST25.txt

Val Ser Ser Leu Cys Gln Gln Ala Asn Lys Gln Leu Tyr Gln Leu Val  
50 55 60

Gln Tyr Ala Arg Cys Met Pro His Phe Ser Ala Leu Gln Leu Glu Asp  
65 70 75 80

Gln Val Thr Leu Leu Arg Ala Ala Trp Asn Glu Leu Leu Ile Ala Ser  
85 90 95

Ile Ala Trp Arg Ser Ile Glu Tyr Leu Glu Ser Asp Ala Glu Thr Ser  
100 105 110

Thr Ser Ser Met Ser Ser Asp Thr Ser Thr Arg Arg Arg Ala Pro Pro  
115 120 125

Gly Pro Pro Glu Leu Met Cys Phe Phe Pro Gly Met Thr Leu His Arg  
130 135 140

Asn Ser Ala Ile Gln Ala Gly Val Gly Pro Ile Phe Asp Arg Val Leu  
145 150 155 160

Ser Glu Leu Ser Val Lys Met Arg Arg Met Asp Leu Asp Arg Ala Glu  
165 170 175

Leu Gly Cys Leu Lys Ala Ile Ile Leu Phe Asn Pro Asp Ile Arg Gly  
180 185 190

Leu Lys Cys Arg Gln Glu Val Asp Ala Leu Arg Glu Lys Val Tyr Ala  
195 200 205

Cys Leu Asp Glu His Cys Arg Thr Gln His Pro Ala Glu Glu Gly Arg  
210 215 220

Phe Ala Ala Leu Leu Leu Arg Leu Pro Ala Leu Arg Ser Ile Ser Leu  
225 230 235 240

Lys Cys Leu Asp His Leu Phe Phe Phe Arg Leu Ile Gly Asp Thr Pro  
245 250 255

Leu Glu Ser Phe Leu Val Asp Leu Leu Glu Ala Gly Pro Ile Gly  
260 265 270

<210> 70  
<211> 66  
<212> PRT



&lt;213&gt; Ctenocephalides felis

&lt;400&gt; 70

Cys Ser Ile Cys Gly Asp Arg Ala Ser Gly Lys His Tyr Gly Val Tyr  
1 5 10 15

Ser Cys Glu Gly Cys Lys Gly Phe Phe Lys Arg Thr Val Arg Lys Asp  
20 25 30

Leu Thr Tyr Ala Cys Arg Glu Asp Arg Asn Cys Leu Ile Asp Lys Arg  
35 40 45

Gln Arg Asn Arg Cys Gln Phe Cys Arg Tyr Gln Lys Cys Leu Ala Cys  
50 55 60

Gly Met  
65

&lt;210&gt; 71

&lt;211&gt; 271

&lt;212&gt; PRT

&lt;213&gt; Ctenocephalides felis

&lt;400&gt; 71

Ser Val Arg Asp Leu Thr Val Glu Arg Ile Leu Glu Ala Glu Gln Arg  
1 5 10 15

Ser Glu Thr Arg Asn Val Ala Thr Asp Pro Glu Leu Ser Ile Gln Tyr  
20 25 30

Leu Arg Val Gly Pro Ser Ser Met Val Pro Pro Arg Tyr Lys Gly Pro  
35 40 45

Val Ser Ser Leu Cys Gln Gln Ala Asn Lys Gln Leu Tyr Gln Leu Val  
50 55 60

Gln Tyr Ala Arg Cys Met Pro His Phe Ser Ala Leu Gln Leu Glu Asp  
65 70 75 80

Gln Val Thr Leu Leu Arg Ala Ala Trp Asn Glu Leu Leu Ile Ala Ser  
85 90 95

Ile Ala Trp Arg Ser Ile Glu Tyr Leu Glu Ser Asp Ala Glu Thr Ser  
100 105 110

FC-4-1.ST25.txt

Thr Ser Ser Met Ser Ser Asp Thr Ser Thr Arg Arg Arg Ala Pro Pro  
115 120 125

Gly Pro Pro Glu Leu Met Cys Phe Phe Pro Gly Met Thr Leu His Arg  
130 135 140

Asn Ser Ala Ile Gln Ala Gly Val Gly Pro Ile Phe Asp Arg Val Leu  
145 150 155 160

Ser Glu Leu Ser Val Lys Met Arg Arg Met Asp Leu Asp Arg Ala Glu  
165 170 175

Leu Gly Cys Leu Lys Ala Ile Ile Leu Phe Asn Pro Asp Ile Arg Gly  
180 185 190

Leu Lys Cys Arg Gln Glu Val Asp Ala Leu Arg Glu Lys Val Tyr Ala  
195 200 205

Cys Leu Asp Glu His Cys Arg Thr Gln His Pro Ala Glu Glu Gly Arg  
210 215 220

Phe Ala Ala Leu Leu Leu Arg Leu Pro Ala Leu Arg Ser Ile Ser Leu  
225 230 235 240

Lys Cys Leu Asp His Leu Phe Phe Phe Arg Leu Ile Gly Asp Thr Pro  
245 250 255

Leu Glu Ser Phe Leu Val Asp Leu Leu Glu Ala Gly Pro Ile Gly  
260 265 270

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